NOVEMBER 1995
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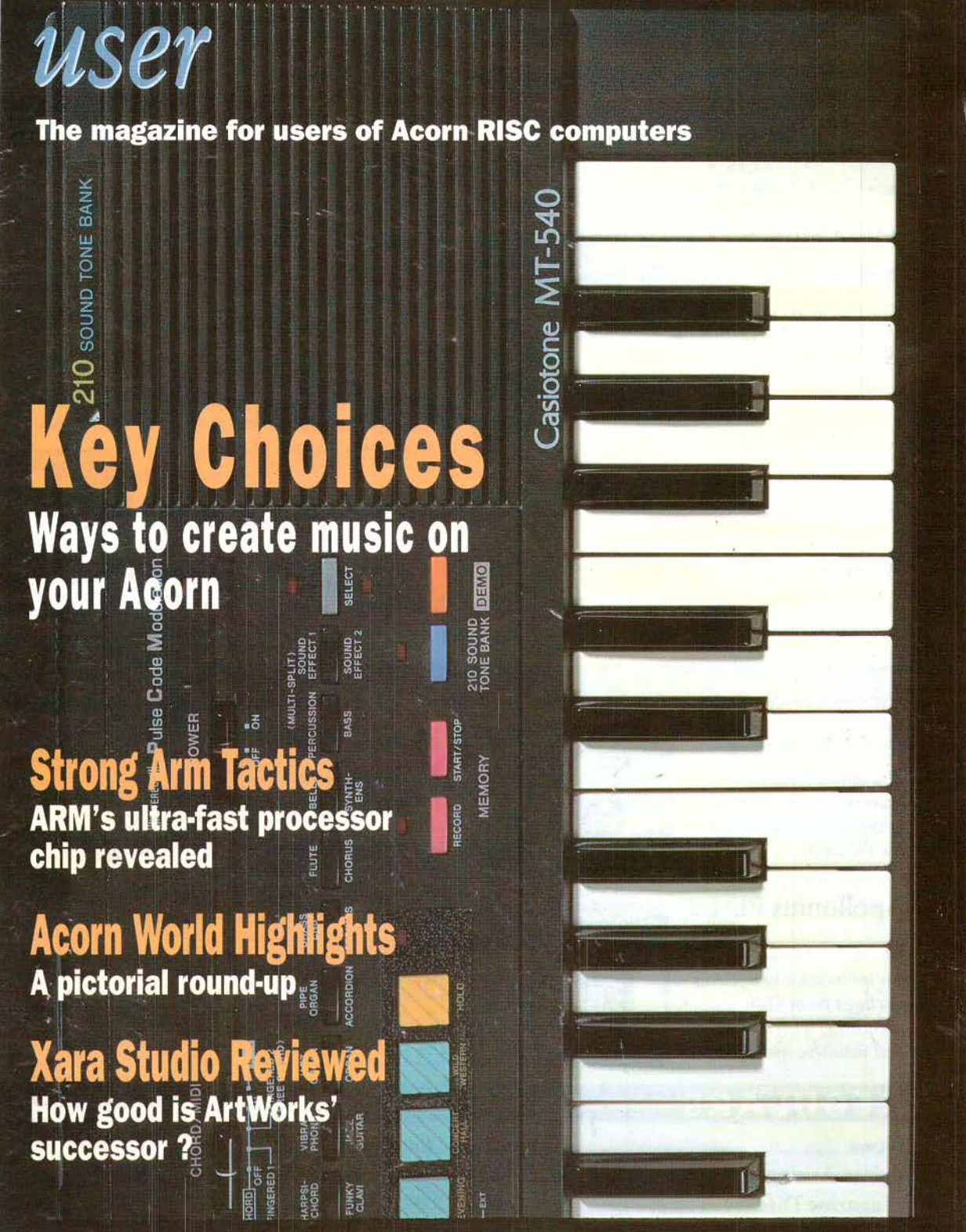
RISC user

The magazine for users of Acorn RISC computers



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Ways to create music on your Acorn

Strong Arm Tactics

ARM's ultra-fast processor chip revealed

Acorn World Highlights

A pictorial round-up

Xara Studio Reviewed

How good is ArtWorks' successor ?

THE MAGAZINE FOR USERS OF ACORN RISC COMPUTERS

RISC user

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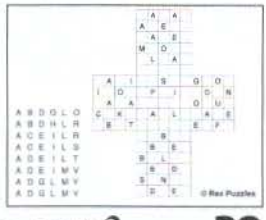

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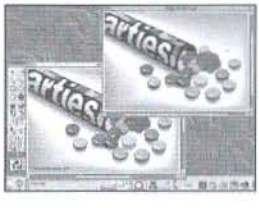

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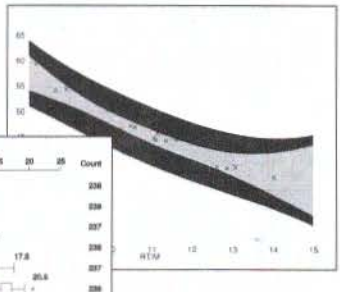

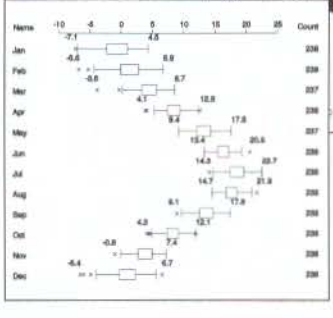

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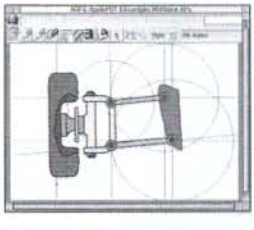

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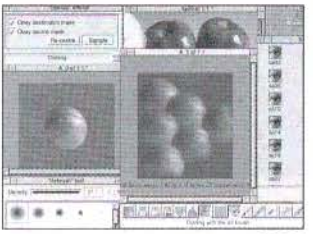

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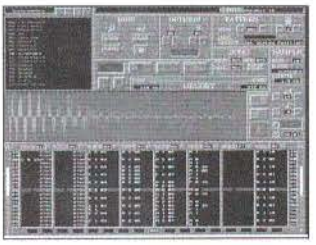

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A new 16-bit soundtracker music creation program

With this issue, RISC User enters its ninth volume and I am taking over the position of editor. As Alan Wrigley explained in his final editorial column last month, he has left the position in order to pursue other interests in the Acorn world. I am sure that I speak on behalf of everyone involved with RISC User in wishing him every success with his new ventures.

It has not entirely escaped my notice that I am taking over the editorship of this magazine at a rather difficult time for Acorn. Looking back at Alan Wrigley's first editorial column just over a year ago, he wrote about the future for Acorn looking bright, and I have to ponder on the fact that, just twelve months later, Acorn has had to take extremely drastic measures in order to survive. It seems that the PC, regardless of any considerations of quality, manages to steam-roller everything in its path. My feeling is that Pentium PCs are rather like electric light bulbs: there's plenty of power there, but around 90% of it is wasted in dissipation!

Well, Acorn needs to shine pretty brightly, now, if it is going to continue making individualistic and excellent products. However, all is not doom and gloom; people have been quick to write Acorn off in the past, but the fact remains that the company is still around, and it's still being innovative. For a company the size of Acorn to be treading its own path in these days of PC dominance is quite amazing in itself, and says something about the quality of its products; and what other company stirs such passions in its customers, I wonder?

When Windows first appeared on the PC, Apple tried to sue Microsoft for stealing its user interface. Now Windows 95 is here, and its brand new user interface looks strikingly similar to RISC OS in many ways. Those in education who are pushing to abandon Acorn machines in favour of PCs would do well to notice that the 'industry standard' machines have now adopted an interface which is remarkably like the one that has been used by schoolchildren for the last eight years. This says a lot about the value of Acorn's innovation.

So, Acorn is still here after a decade and a half, and its innovations finally appear to be working their way into the PC world. There are still exciting times ahead, and some extremely impressive products just around the corner, as you will discover by reading some of this month's articles. I look forward to my future with RISC User, confident in the knowledge that it won't be dull.

Richard Hallas

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Acorn Gets Chirpy About Future Prospects

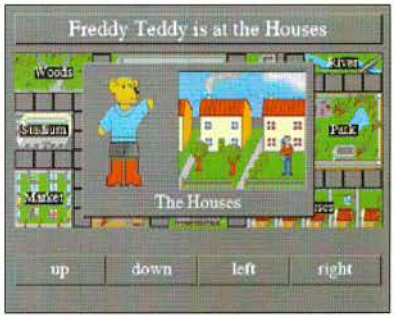
Following the recent reorganisation at Acorn, details are emerging about future developments in the pipeline from Applied Risc Technologies, Acorn's new development arm. Despite predictions of doom and gloom from some quarters, ART are committed to the continuation of RISC OS for at least the next five years, and some of their current plans offer some mouthwatering prospects (see page 10 for ART boss Peter Bondar's personal vision of the future). 1996 should see the launch of the next generation Risc PC, using a StrongARM chip (see page 11 of this issue). This machine is predicted to be around 6 times faster than current Risc PCs. It is likely that a StrongARM second processor will be made available at the same time for existing Risc PCs at an attractive price, thus future-proofing current models.

In early 1997 Acorn plans to launch the third generation Risc PC, again using a StrongARM but this time built around CHRP (pronounced "chirp") technology. This stands for Common Hardware Reference Platform and is a standard being developed for the PowerPC by IBM and others. The CHRP-based Risc PC will be around 12 times faster than current models.

At the same time, ART is continuing to develop multi-processor technology, and a multi-processor card was being shown in operation at Acorn World. TAOS (see RISC User 8:9) still seems to be the preferred operating system for multi-processor development, and it is likely that a future version of RISC OS may well be based on TAOS.

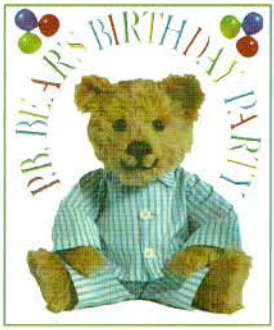
Other snippets of future technology were being shown at Acorn World. There was a multi-tasking version of Replay, which as well as allowing you to play movies while other applications are working, also offers the intriguing possibility of playing several movies at the same time, which gives a whole new meaning to the word 'multimedia'. *VideoPhone* is a system under development which will allow two-way audio and video communication between computers. *TimeCode* is designed to make use of the industry-standard timecodes which are encoded onto most CDs in order to synchronise multimedia devices and programs for animations and presentations.

New Direction for Freddy



Topologika's Freddy Teddy series moves into its eighth incarnation with *Directions*, which challenges children to move Freddy Teddy around his village and remember what they see on the way. An Acorn version is available for £20 ex. VAT, with a PC version coming soon. Also new from Topologika is *Maths Book*, which allows children to practice addition and subtraction. The package is fully configurable, including the size of the sums, and costs £35 ex. VAT. Finally, *MIDIBox* allows users of Topologika's *Music Box* to use MIDI sounds rather than those supplied with the program. As an added bonus, it will also allow Maestro and other non-MIDI music programs to make use of MIDI sounds. The price is £20 ex. VAT. Topologika's address is Islington Wharf, Penryn, Cornwall TR10 8AT, tel/fax 01326 377771.

Grin and Bear it



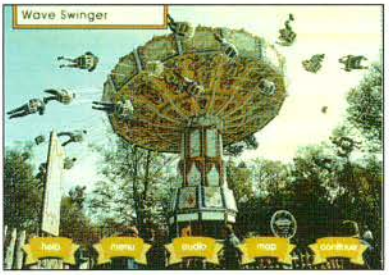
Dorling Kindersley is a well-respected name in publishing and there has recently been some excitement over the fact that DK has decided to issue some of its high-quality CD-ROMs in Acorn format, using a front end developed by Desktop Laminations. The first to appear is *P.B. Bear's Birthday Party* and this will be followed soon by other titles including *The Way Things Work*. Other CD-ROM titles to appear on the Acorn platform recently include Microsoft's *Dinosaurs* and *Musical Instruments*, courtesy of Innovative Media Solutions, and these titles were demonstrated at Acorn World. Following Nelson Multimedia's entry into the Acorn market last year (Nelson is now part of the giant Yorkshire International Thomson Multimedia conglomerate) and the plethora of titles released recently by Anglia, the Acorn CD-ROM scene is looking very healthy indeed.

It's Good to Touch

Two touch screens have appeared on the market this month, one from SEMERC and the other from Lindis. Both products cost around the same and provide very similar facilities - i.e. the ability to control the pointer simply by touching the screen instead of moving the mouse. However, the technology employed is very different: SEMERC's offering, called *Touch IT*, is operated by infrared and therefore requires a power source, which is supplied with the screen. *Simple Touch* from Lindis on the other hand works by pressure sensitivity which requires no extra power and is claimed to give more accurate performance. Both products are suitable for Acorns and PCs, but Simple Touch (£225 ex. VAT) is suitable for 14" and 15" screens, whereas Touch IT (£229 ex. VAT) only fits 14" models.

SEMERC can be found at 1 Broadbent Road, Watersheddings, Oldham OL1 4LB, tel. 0161 627 4469, fax 0161 627 2381, while Lindis is at Wood Farm, Linstead Magna, Halesworth, Suffolk IP19 0DU, tel. 01986 785476, fax 01986 785460.

On the Break



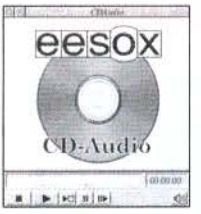
Breakaway Maths is a new CD-ROM from Yorkshire International Thomson Multimedia which aims to make maths fun for slow learners. Set in Alton Towers and aimed at the National Curriculum attainment levels 1 to 3, it encourages problem-solving with the help of graphics, video and sound. The complexity of the exercises is adjusted automatically according to the user's performance in an attempt to increase the motivation to succeed. Breakaway Maths costs £65 ex. VAT. For more details contact YITM at The Television Centre, Leeds LS3 1JS, tel. 0113 243 8283, fax 0113 243 4884.

Size *Does* Matter - Got the Picture?

Longman Logotron has released a new image processing package called *The Big Picture*. The application has been designed to provide powerful facilities while being easy to use and having only modest hardware requirements. It supports 24-bit colour and a wide range of image formats including all the usual ones such as GIF, JPEG, TIFF, PhotoCD and of course sprites. Images can be any size, enabling posters to be created. A virtual memory system is incorporated so that the package will run quite happily on a 1Mb Archimedes. The Big Picture costs £69 (single user), £190 (primary site licence) or £330 (secondary site licence), all ex. VAT.

Also new from Longman is *Music Studio 32*, a 32-track music processor specifically designed for educational use. More sophisticated than Longman's existing Notate program, Music Studio 32 is claimed to be the most comprehensive music editing program available for RISC OS, providing a score editor for traditional music notation with drag and drop positioning of notes, a sequence editor allowing tracks to be moved and quantized, a grid editor for detailed non-notational editing, and a layout editor for tidying up the score for printing. Music can be captured from a MIDI instrument prior to editing. Music Studio 32 costs £79 (single user), £190 (primary site licence) or £330 (secondary site licence), all ex. VAT. For further details contact Longman Logotron at 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS, tel. 01223 425558, fax 01223 425349.

Precious Metal



Eesox has announced updates to its range of CD drives. The Bronze double-speed drive which operates via the parallel port (see the review in RISC User 8:8) has been upgraded with a claimed speed increase of 35%. If you want something faster, an addition to the range, the Bronze Elite, is a quad-speed version. At the same time Eesox has released a parallel port driver for PC compatibles which allows you to share the same drive between an Acorn and a PC, and a conversion kit that enables you to convert most SCSI CD drives into parallel port drives. Prices (all inc. VAT) are £199 for the Bronze, £299 for the Bronze Elite, £19.99 for the IBM Parallel Port Driver and £35.25 for the Parallel Conversion Kit.

Also new is an ATAPI version of the quad-speed Gold drive, which Eesox claims is one of the fastest quad-speed IDE drives on the market. It is a tray-loading model with a latch to allow it to be used in tower mode. The drive comes with Eesox's ATAPI driver, but it requires RISC OS 3.6 and so at present can only be used on a Risc PC 700 or A7000. The Gold ATAPI drive costs £170.37 inc. VAT.

A Strong Thumbs Up for ARM

The postman was kept busy this month with no less than five press releases from ARM Ltd. Several of these involve the Thumb chip mentioned in last month's News: both GEC Plessey and Texas Instruments have licenced the use of the Thumb for their consumer and communications microcontrollers, while Symbios Logic, a leading supplier of bus interfaces, will use the chip in its I/O controllers. At the other end of the power spectrum, a joint press release from ARM and DEC confirmed the arrival of the first StrongARM processor during 1996. ARM can be contacted at Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN, tel. 01223 400400, fax 01223 400410, Web http://www.arm.com.

More News from Acorn

As part of its reorganisation, Acorn is establishing a network of Acorn Centres of Technology, based on nine existing Acorn dealers (including Beebug) who have been chosen for their commitment to enthusiasts. Acorn will provide support and financing options to enable the CoTs to continue to market Acorn equipment effectively to advanced users.

PC Exchange is an application that enables the transfer of data between RISC OS and Windows. This means that if you are running Windows in a window on the RISC OS desktop, you can treat it just like any other RISC OS application and transfer data to and from it, in this case via the Windows Clipboard.

If you're quick, you can get £100 off a Cumana CD drive by buying an A4000 or A4000S before the end of November. The deal also includes £190-worth of free software. Another offer, which this time runs until 31 December, is for an A3010 Early Years computer (no monitor) for £199. Both these offers are available from Acorn Education in accordance with the new educational sales structure announced recently.

Acorn's address is Acorn House, Vision Park, Histon, Cambridge CB4 4AE, tel. 01223 254254, fax 01223 254262, Web http://www.acorn.co.uk.

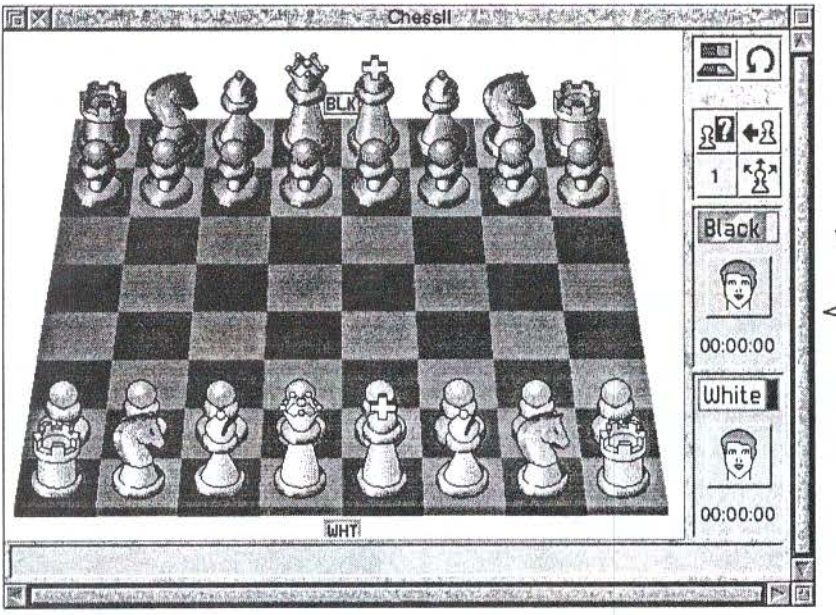
Anglia Multimedia is to launch an Internet service aimed at teachers, parents and children. It will contain details and examples of Anglia's products, news and support areas and also an information exchange area where teachers can exchange ideas. The Multimedia Club area will be aimed at parents and children accessing from home, while the Learning On-line area is aimed at teachers and will support the use of IT in the classroom. The service is likely to be online by 1 January 1996. For more details contact Anglia Multimedia at Anglia house, Norwich NR1 3JG, tel. 01603 615151, fax 01603 622191.

GraphMate is a new package from Dalriada Data Technology. It is claimed to be unlike any other Acorn graph drawing application in that it concentrates on providing full control over every aspect of the graph rather than simply offering a wide range of graph types with little control. It takes an object oriented approach to graph drawing, and also offers OLE facilities. GraphMate costs £45 inclusive (single user), £60 (primary licence) or £120 (secondary licence). Dalriada is at 145 Albion Street, Kenilworth CV8 2FY, tel/fax 01926 53901.

Xara, the arm of Computer Concepts responsible for Studio (see the review elsewhere in this issue), has signed a deal with mighty Corel (of CorelDraw fame) to give Corel exclusive marketing rights to Studio, now called CorelXARA. It will be sold alongside Corel's other products as an entry-level application for customers who do not want all the professional features of CorelDraw such as colour separations. The deal covers marketing rights only - Xara continues to own the copyright and the right to develop the application in the future. At the time of writing the price had not been fixed but was expected to be a little lower than the £199 originally planned by Xara for Studio.

There is apparently no truth in the rumours that CC is developing ArtWorks Pro. However, all existing ArtWorks users will hope that CC can be persuaded one day to import Studio to RISC OS, although CC has said this will not happen unless MFC libraries appear for RISC OS sooner rather than later.

Make your move to the best Chess!



Price £16 all inc.

The Chess program Archimedes World recent survey rated the best game play. All the features of the old Chess program, plus Choice of 2D or 3D board, Save game as Sprite, Draw or Text, Rotate board, Show hint. Easy setting of play level. Replay last move. Show possible moves. Continuously updated history window. Improved game play. RISC OS Printer driver support.

Upgrade from Chess 1 to Chess 2 £10+old disc. Prices all inclusive.

Bubble Help II

Bubble Help is a replacement for RISC OS !Help. It provides help where you need it - at the pointer in a cute bubble.

It makes full use of outline fonts so help is easy to read. It bullets and justifies text and it doesn't use much memory.

RISC PC and Network compatible. Fully configurable. Comes with printed manual and a choice of bubbles

Price £5, all inclusive

New Enhanced Version 2.11

David Pilling, P.O. Box 22, Thornton Cleveleys, Blackpool. FY5 1LR. UK.

Free Air Mail delivery on overseas orders. email david@pilling.demon.co.uk

ACORN WORLD HIGHLIGHTS

Queueing for a dose of Multimedia Experience

General view of the hall from the Beebug end

Words and pictures by Lee Calcraft

Wembley Exhibition Hall was the venue for another well attended and highly successful show. Quite clearly the doom and gloom surrounding Acorn's poor financial results has not shaken the confidence of Acorn users, and stand-holders recorded excellent levels of interest throughout the three day event.

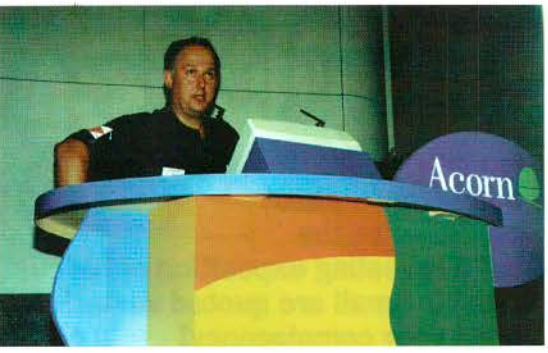
Acorn's two new divisions - Applied Risc Technologies, and Acorn Education were both in evidence, with ART staff in black sweatshirts, and educationalists (much in the majority) in blue. Staffed by blue team member Neil Gardner, and from the black team, Stewart Palmer, the Multimedia Experience proved very popular. Running hourly shows, Neil and Stewart presented an upgraded version of last year's room of the future, demonstrating the

Thomson Multimedia with their brand new video wall

Music for sale - Sibelius 7, with Sibelius 6 going for a song

Spacetech's FotoFUN photographic quality printer

Walter Briggs conjures up another masterpiece with Studio 24



ART's Big Cheese, Peter Bondar, upbeat in front of a theatre full of Clan members

power of ARM-based technology to deliver state-of-the-art multimedia solutions.

In a packed theatre self-styled Chief Honcho of ART, Peter Bondar, delivered an upbeat talk to Clan members, where he enthused about 50MHz A7000s and third generation Risc PCs based on the StrongARM processor, which will support PCI-based peripherals and other operating systems (which may include the Power PC). Other projects currently under way include SkyNet, which will add new system objects to the operating system, the first of which, PC Exchange, is already available as a softloadable module for RISC OS 3.5.

A major focus of the show was provided by Acorn's Cyber Cafe area where visitors could access the Internet on a bank of Acorns, and at which Blue Peter presenter Diane Louise-Jourdan linked up live to a second set of Acorns at CBBC's Big Bash in Birmingham. There was also plenty for the kids, with a creche for youngsters, jugglers, face painting - and of course, lots of games to try out. In short, a good time was had by all.

Fun for everyone

Action at the Cyber Cafe: Blue Peter presenter Diane Louise-Jourdan links up with CBBC's Big Bash in Birmingham.

Head Honcho Gets it Straight!

White coated Honcho
Photograph: Lee Calcraft

Following a lively discussion on the Acorn newsgroups about the recent changes in Acorn's structure, Peter Bondar, the Director of Applied Risc Technologies, posted a revealing exposition of his belief in the future. The important points from his email are quoted verbatim below. Be warned - this could seriously damage your complacency!

"OK this looks like the final conflict so here goes: I have watched the mail flying around and would like to put the record straight. I am the big cheese, head honcho, numero uno of ART and what I says goes!"

1. I personally want to build cool and funky computers for as long as there is the remotest financial justification to do it!

2. We have absolutely no plan to drop Risc PC/A7000/RISC OS *at all*!

3. We cannot justify the R+D to build funky computers solely for UK Education.

4. We can sell *loads* of R+D/Design skills to *lots* of people all over the world.

5. We can make loads of money out of this (witness our share price staying up - why? Because the city analysts can see the demand for ARM based designs and technologies). That money and technology transfer will come back to help produce funky technology which we can afford to put back into our "normal" computers.

6. By expanding our customer base intelligently we can generate profits that can pay for more R+D, which delivers more weird products so that we can all salivate away.

7. Yes we have restructured our former technical division and yes we have lost some people and NO we did not enjoy doing that!

8. What we did do was to completely redefine our processes and procedures for building products and the people we have lost are largely (90%) people involved in project management, drawing office, paper shuffling and services that can be bought in from dozens of companies around Cambridge.

9. We *have* kept the bright people who are the future intellectual worth of the company.

10. Much as I have spent most of my working life in marketing it has always been in high tech companies, and with a degree in solid state physics and computers, and having built compilers and PLL decoders and programmed extensively for the first two years of my working life as well as being a ham G6FTE, I do consider that I have a reasonable grip on the technology, so *do not* judge the book by its cover!

11. Acorn did need a fundamental kick up the backside into the late 20th century. I speak for many of my colleagues who have wanted to improve the financial and technical performance of Acorn and have felt frustrated in our inability to bring about the changes required to be successful on a global scale. David Lee has allowed us this opportunity and frankly it's a breath of fresh air!

12. David Lee our MD is anything but an "Intel lover" but recognises the fact that if somebody wants to buy 50,000 PCs and 10,000 Macs why don't *we* sell them. It *does not* detract one jot that we can sell 50000 RISC OS computers *as well*!

13. There is no 13.

14. I can assure everyone that if we did not undergo a fundamental restructuring then a number of us *would* have left and the old school would have sailed into the sunset, copyright SS Titanic, Crisis what Crisis!, and the band played on!

15. What some readers of comp.sys.acorn forget is that Anoraks are not understood by the vast majority of the world, yet despite all the carping, we *still* run the Clan and *still* will spend £250,000 on Acorn World, *still* plan to ship the Multiprocessor card, *still* will produce very high performance PC cards mainly for Anoraks, *still* will produce 3rd generation Risc PCs *despite* the fact that schools do not need the graphics and go that this will give... WHY? Because we are all Anoraks here as well in Acorn Education, ART and OM (not too mention some in ARM) and *we want too*! and *we can* and *we will* even if you disbelievers cannot hack it yourselves!

16. As I type this my guys are already in the design process for the successor to the Risc PC and if we choose to use a few bit players such as DEC semiconductor, IBM Blue Micro, FTDI and Apple then I'm sorry but you had better rush off and buy your wonderful Pentium boxes if you think that's where it's at! My guys don't happen to think so and we will prove you wrong!

The Empire Strikes Back!!!!!!!

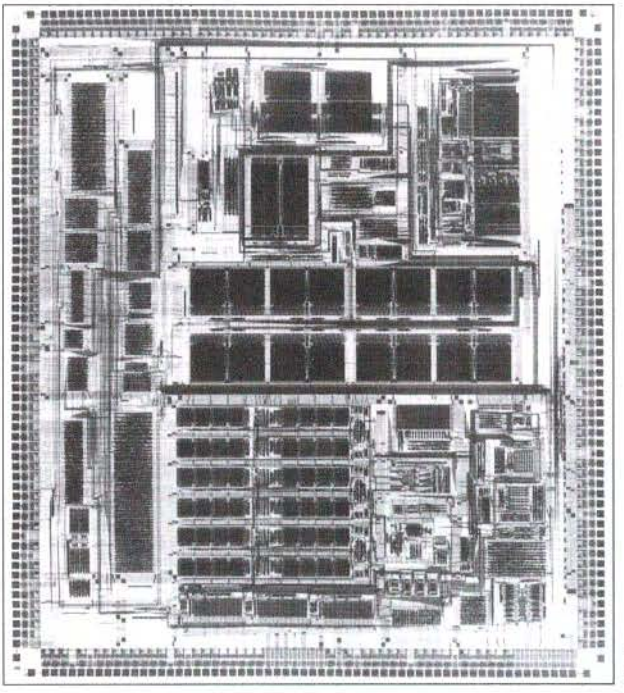
Strong Arm Tactics

Lee Calcraft reveals ARM's latest plans for an ultra-fast processor chip

As you may remember, the ARM processor was developed at Acorn Computers in the mid-80s, and first saw commercial exploitation as the ARM 2 which appeared in the first of Acorn's 32-bit computers - the Archimedes A300 series - in 1987.

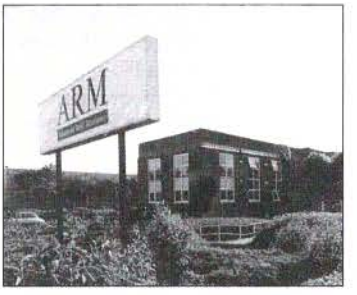
As you probably also know, the ARM processor uses so-called RISC technology - standing for Reduced Instruction Set Computer. This means that the processor uses far fewer components (has a much lower transistor count) than traditional processors, and has a limited instruction set as a result. This means that for example, while you can issue it with a single instruction to multiply two numbers together, there is no equivalent for division. If you are writing a low level program (i.e. a machine code program) for the ARM processor, you therefore need to supply division routines etc. in software.

However, what you lose by this approach is more than made up for by the much greater efficiency in executing the most common instructions. And because the processor is much less complex, it is in theory easier to produce, and consumes much less electrical power, and therefore generates much less heat than its equivalent CISC processor (Complex Instruction Set Computer). That is why you can fry eggs on the 486 card in your Risc PC, but can't melt a pat of butter on the ARM 610 that sits opposite it.



The ARM 7500

It is the excellent processing speed of the ARM chip combined with its very low operating power that has made it so popular with a number of big players in the marketplace, and in 1990, together with Apple and VLSI, Acorn set up ARM Ltd to exploit their innovative processor. Already the ARM chip has found its way into the Apple Newton handheld computer, and into 3DO's games machine.



ARM's premises in Cambridge

More recently ARM have negotiated a deal with Digital Semiconductor to develop a new family of ARM devices called StrongARM, which will succeed the ARM 7 series, and preceed the ARM 8. These will exploit the well-proven internal architecture of the ARM series of processors, but will apply advanced low-voltage CMOS technology using 0.35 micron processes rather than the 0.6 micron used previously, and

Continued on page 15

X Marks the Spot

Richard Hallas dusts off his PC card to find out if Xara Studio is as good as it sounds

There has been much consternation amongst Acorn enthusiasts over the fact that Computer Concepts, under the name of Xara, has written a PC-only follow-up to the much-acclaimed ArtWorks. Like it or not, the best we Acorn owners can do for the foreseeable future is either to stick with ArtWorks or run Xara Studio under a PC card. The purpose of this review, therefore, is to see how well Studio performs under the co-processor, and what its advantages are over ArtWorks. I have been running Studio under Windows for Workgroups 3.11, for the most part with an Aleph One 486DX2/80 PC card, although I was also able to test out the program using an original-issue Acorn 486 card.

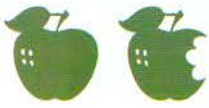


Figure 1. The freehand tool has been used to remove the bite from the apple.

As you may have read in the news pages, Xara Studio is shortly to be re-released as CorelXARA, in a slightly enhanced version 1.1. Bear in mind, therefore, that the product under review here will change a little before it becomes available again.

In comparison with ArtWorks

Most of the underlying features of Studio are very similar in concept to those in ArtWorks, though the tools in the earlier package have been refined where possible. Therefore, anyone who is used to the ArtWorks way of creating objects will feel at home immediately. For basic shape creation, the drawing facilities seem very familiar: the freehand tool is present, but ArtWorks' two separate curved- and straight-line tools have sensibly been amalgamated into a single tool in Studio.

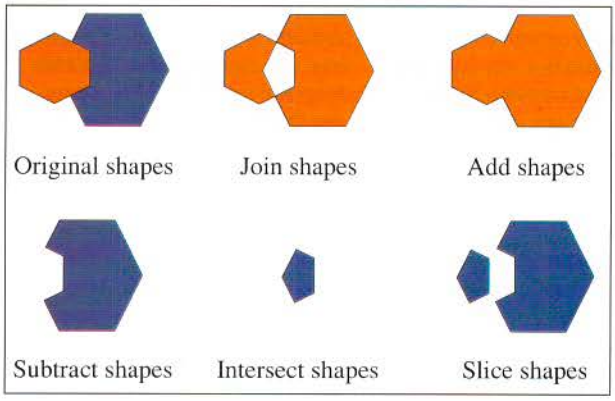


Figure 2. Various ways of combining shapes.

It is when you start to use these common tools that you realise that Studio is much cleverer than ArtWorks about understanding what you want to do and letting you do it easily. For instance, like ArtWorks, if you click on a selected line, a new point will be added to the line where you clicked; however, in Studio, if you drag instead of clicking, you can alter the curvature of that portion of the line.

The freehand tool has been transformed. I always felt its use was somewhat limited in ArtWorks, as you had to guess how accurate you wanted the curve-fitting to be, adjust the slider appropriately, draw your shape and then do it again if it wasn't right. In Studio, though, the facilities are much more powerful. First of all, there's an eraser, so holding down

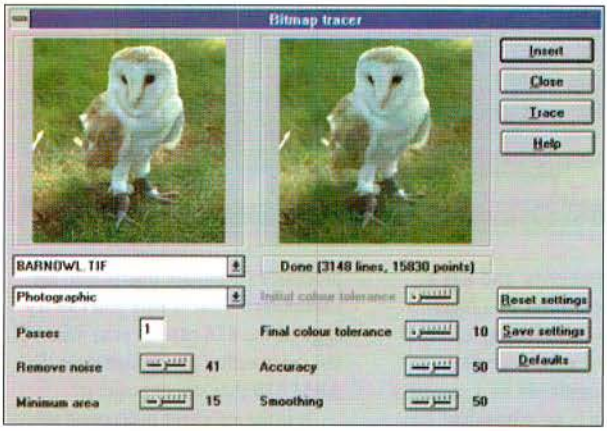


Figure 3. Turning a 24-bit colour bitmap into a vector graphic in the bitmap tracer.

Spot the difference: ArtWorks on the left, Studio on the right.

Shift lets you rub out a slip. In addition, the smoothing slider can now be adjusted *after* you draw your freehand shape; you can keep dragging the slider until you are happy with the result. Similar smoothing facilities are also available if you select multiple points on any line.

Best of all, though, is that the freehand tool lets you edit existing shapes by simply drawing on them. Imagine you have drawn an outline of an apple and want to take a bite out of the side: simply point at where you want the cut to start, draw the teeth-marks with the freehand tool, and release the button where the cut finishes. Instantly, the piece you drew is nibbled out (see figure 1)! Such facilities as these extend to other areas of the package. For instance, whilst ArtWorks lets you join several shapes into one outline so that you can make shapes with holes in them, Studio also lets you add, subtract, intersect and slice shapes (see figure 2).

A new means of shape creation is Studio's QuickShape tool, which allows virtually any shape with rotational symmetry to be drawn very easily. To use QuickShape, you select how many sides your shape should have, whether it has rounded corners, and whether it is a regular polygon, an ellipse or a star shape; then you just drag to create it. The attributes of a QuickShape are quick and easy to alter by clicking and dragging, just like any other shape; but altering one point or edge causes all other corresponding points or edges to alter in sympathy. It's all very flexible, quick and easy to use.

Even the selector tool options are better than the ones in ArtWorks. You can choose whether to show bounding-box handles or control points for selected shapes, along with optional rotation and fill handles. Clicking on a selected object toggles between scale & stretch and rotate & skew mode; and the eight handles around the selection change their meanings. The middle handles on each side skew or stretch the object according to the mode, whilst the corners scale or rotate it.

Moulding facilities, layers, blends and colour handling are all much the same as in ArtWorks, overall, with some minor improvements, such as rainbow effects for blends, and linked colours, where one colour can be the 'parent' of another. These are similar to tints, but more powerful. A version of the ArtWorks Arranger magnetic tool (see review in RISC User 8:4) is built into Studio, though you cannot make it work with specific layers as you can in ArtWorks; only snapping to individual objects is possible.

Light the blue touch paper...

Now we have covered the basics, there are some real fireworks to be seen. Two of the most impressive things in Studio are its fill and transparency features. Whilst ArtWorks has just flat, radial and graduated fills, Studio also has elliptical, conical, bitmap and fractal ones. The latter two are particularly interesting:

Xara Studio

bitmaps can be any sprite-style image, whilst fractal fills are always unique, generated as you use them, with user-definable graininess. For both bitmap and fractal fills, you can choose the resolution in dots per inch, along with various scaling and tiling options. You can even modify the brightness and contrast for bitmaps, and the start and end colours for other fill types.

Transparency is one of the most desirable features in this package, and is quite amazing in use. Not satisfied with objects being simply transparent, Studio lets you have graduated transparency. All the fill options are available, including fractal and bitmap transparency. You can also define the degree of transparency of the object, and make it go from completely transparent to completely solid, or somewhere in between. You can also choose the type of transparency: Mix, Stained glass or Bleach.

Text handling is vastly improved over ArtWorks. You are allowed multiple lines within one text object, and can select regions and make changes to them, from something as simple as emboldening through to applying a graduated fill. So, for example, you can have multiple lines, colours and text styles within a single text object. Other facilities include justification, sub- and super-script, horizontal and vertical kerning and tracking. The ArtWorks 'Fit text to curve' option is still there, but it's much nicer now: you can just select a line with the text tool switched on, and type your text along it immediately. It's even possible to fit paragraphs along a curve.

Bitmap facilities

Studio is, of course, basically a vector art package, but its handling of bitmap images is quite impressive, and many image processing options are available for bitmap images, such as filtering, colour control, scaling and so on. The most impressive bitmap tool, though, is the tracer, which converts bitmaps to vector format images (see figure 3). Tracers are notoriously difficult pieces of software to write successfully; usually, their results are dubious unless you play around with them for a long time, and they usually take an age to trace images. The tracer in Studio is quite amazing, though. For a start, it is perfectly happy to trace 24-bit colour photographs, which is an achievement in itself; and on top of that, it's amazingly fast and accurate. Quite simply, it's by far the best bitmap tracer I've yet seen. It may not have all the facilities of dedicated packages for editing exactly how the tracing takes place, but the range of controls and the built-in intelligence are perfectly adequate for outstanding results to be easily achievable; and Studio's line-smoothing facility is invaluable in combination with traced images.

Performance

Xara claims that Studio is the fastest vector package in existence, and up to twenty times faster at redrawing images than CorelDRAW! Speed is of the utmost importance in a package of this nature, and before Studio appeared, it was Acorn users who enjoyed the fastest vector package around, in the form of ArtWorks. It is claimed by Xara that Studio, running on a standard Acorn 486 card, will perform at a comparable speed to ArtWorks running on a Risc PC. I tested this claim by timing the redraw of some files which were common to both ArtWorks and Studio.

Table 1 shows the speed of redraw (in seconds) between ArtWorks on my Risc PC 600 and Xara Studio running on an Acorn 486 card and an Aleph One 486DX80/2 card. Each PC card category has two columns: 'Background' is (ArtWorks-like) multitasking redraw, whilst 'Immediate' is the optional, faster, non-multitasking redraw. Note that the Midget and Watch2 files were not tested with ArtWorks because they use some of Studio's more advanced features, such as transparency.

The figures speak for themselves: used on a fast Aleph One PC card, Studio's performance is excellent, and around 30% faster than ArtWorks on average; however, with the slow Acorn 486 card, redraw takes five to six times longer than ArtWorks, and is really too slow for serious use.

I have to say that I was a little disappointed about file loading times: Studio took much longer than ArtWorks to load a file initially. As an example, the Kingfisher drawing took 8.5 seconds to load from CD-ROM into ArtWorks, but with

Table 1: Redrawing speeds

Filename	ArtWorks	PC486 Background	PC486 Immediate	DX80/2 Background	DX80/2 Immediate
Arties	25.5	149.56	109.41	18.51	11.15
JagSS100	5.1	27.25	17.52	4.78	3.08
Kingfisher	10	68.44	53.83	7.97	5.77
Midget	N/A	37.18	23.29	5.55	3.68
Watch2	N/A	100.08	67.73	10.16	6.92

Studio it took 54 seconds using the DX80/2 card, and a staggering 4 minutes 50 seconds on the slow Acorn card! Studio will load Acorn Draw and ArtWorks files, though I experienced some difficulties (none insurmountable) in exporting Studio EPS files back into ArtWorks.

Overall

The tools described above sound impressive enough in themselves, but it is not until you use the package that you realise how well everything integrates together. As a simple example, you can draw a vector shape on top of a bitmap and then subtract the shape, effectively cutting a hole in the bitmap; but that hole has perfectly smooth edges, and remains editable! There has not been enough space to cover all the features, such as the selector windows ('galleries') for fonts, clip-art, colours and so on, or the way that virtually every aspect of the program can be customised. You can drag and drop virtually everything on the screen, including colours. The only major thing that it doesn't do and which is available in ArtWorks is printing of colour separations; but that feature is likely to be included in CorelXARA.

All the existing ArtWorks features have been improved, some in a major way, and the brand new features are superb. It's an extraordinarily good package, and the only thing that really lets it down is the Microsoft software under which it is obliged to run. If you use ArtWorks intensively, then it is well worth considering the purchase of either a fast Aleph One PC card or a second-generation fast Acorn PC card in order to run Studio. I would say that the first batch of Acorn PC cards are really not up to the job of coping with this program, though; everything is too sluggish. Bear in mind that for decent performance, you need to give Windows at least 12Mb RAM, and preferably 16Mb, plus extra for VRAM; really, you need over 20Mb in your Risc PC for sensible performance.

Product Xara Studio
Supplier Xara Ltd
Gaddesden Place
Hemel Hempstead
Herts HP2 6EX
Tel. 01442 350000
Fax 01442 350010
E-mail: Info@xara.co.uk
Price £199 ex. VAT
(£99 ex. VAT for CorelDRAW! owners)
Note: currently unavailable pending re-release as CorelXARA. Pricing may alter.

Strong Arm Tactics

Continued from page 11

facilitate the production of extremely power-efficient processors.

ARM have just released details of the first product in the StrongARM family, the StrongARM-1 (or SA-1). This is a so-called processor core - a very small unit which forms a part of a processor chip. For example, the ARM 610 chip contains an ARM 6 core as well as a data cache and other units which are all put down on a single piece of silicon to make up a single processor chip. The SA-1 contains over 115,000 transistors in less than 4 sq mm of silicon (about the area of a pinhead), it dissipates only 120 milliwatts of power at full stretch, and here's the really good bit, it will run at 160Mhz or more (even the ARM 710 is only clocked at 40Mhz). According to ARM Ltd, a processor chip based on this core should be capable of delivering better than 150 MIPS (150 million instructions per second). When you have got up from the floor, compare this to 30 MIPS for the Risc PC's 610 blisteringly fast processor running at 33Mhz, or 40 MIPS for the even faster ARM 710 running at 40Mhz. Naturally, I have already put my order in!

Apart from increases in clock speed, the StrongARM achieves its improved performance through changes in internal ARM architecture. For example, the StrongARM uses a so-called Harvard-style architecture in which separate instruction and data caches are used to improve throughput. The pipelining has also been upgraded to 5 stages from the current 3. Other features include early branch execution, single cycle shift-adds, a high performance multiplier and a new five-port register file.

ARM Ltd will be targeting both the high volume handheld and the digital video markets with the StrongARM family. This includes products such as personal digital assistants, organisers, cellphones, interactive video games and set-top boxes. They expect to introduce the product in the first quarter of 1996, with volume production in the summer of that year; and it is expected that this will be followed by a 200Mhz version which will deliver upwards of 200 MIPS.

We also have it on good authority that Acorn are developing additions to their 32-bit computer range which will feature the StrongARM. It is also reasonable to expect that either Acorn or other third parties might market a StrongARM processor upgrade card for the Risc PC, though it seems likely that the new processor would be severely impeded by other fixed parameters in the 'older' machines, such as RAM access times and the like.

Why are you waiting

when you could be using an Aleph One Risc PC card?

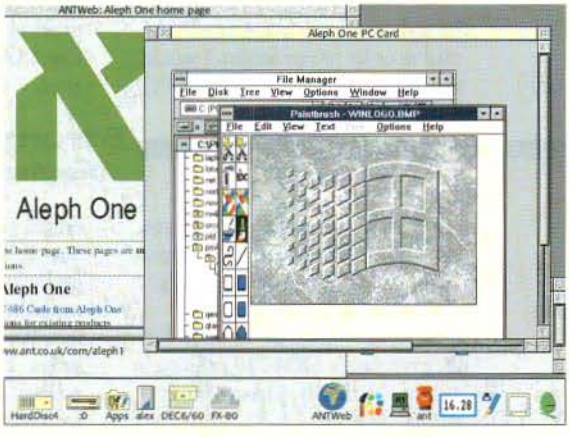
You won't wait around for an Aleph One Risc PC card. Its powerful 486DX processor will complete tasks much more quickly than the alternatives. The card fits easily into your Risc PC's second processor slot in a few seconds.

Fast processors

Software executes at real PC speeds with a choice of powerful 486DX-40 or 486DX2/80 processors blazing through all your tasks.

Windows support

You can use most standard Windows or DOS software on the Risc PC card – at the same time as your existing RISC OS software. You may also wish to connect to existing PC networks.



ARM graphics support

While you're working in Windows, the RiscPC's ARM processor is still busy acting as a graphics accelerator to further boost performance. High-resolution Risc PC video modes are supported, up to 1280x1024 resolution. Subject to suitable VRAM being fitted to the Risc PC, you can enjoy up to 24-bit colour and a 256 colour palette in 8-bit per pixel modes.

Share Acorn peripherals

Save money compared with the cost of buying separate systems: the PC card can use all your Acorn peripherals including hard discs, removable discs and CD-ROMs, Ethernet network cards and printers.

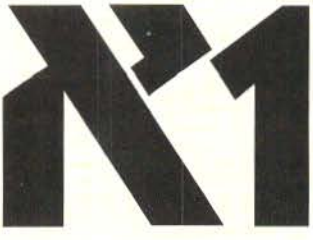
Connect to PC networks

Use the Risc PC card with optional networking software to bridge between your computer and local area networks. Any PC network server can be used – Novell Netware or Windows .

Recommended retail prices

Choose from the 486DX-40, running at 40MHz, for **£349**, and the 486DX2/80, running at 80MHz, for **£399**. Cards are available direct from Aleph One.

Also still available at new reduced prices – Aleph One podule 486 cards for the A5000, A540, A4x0. 486SLC-25 is £299 and 486SLC2/50 is £349 (prices exclude VAT and RAM). RAM for Risc PCs and podule cards £99 for 4MB, £199 for 8MB and £379 for 16MB. All prices exclude VAT.



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Wimp Topics - A Shifting Heap Memory Manager

by Alan Wrigley

Back in RISC User 7:5 I described how to implement a flexible memory manager using the Heap Manager routines built into RISC OS. This has proved to be one of the most popular programs we have published and has been used by many readers in their own programs. However, it suffers from one major problem, namely that the Heap Manager can only implement a static heap. In other words, once a block of memory has been allocated, its location does not change. If it is subsequently deallocated, the empty memory may just sit there unused unless the Heap Manager is asked to allocate another block that will fit inside the original one. This gives rise to the infamous 'Swiss cheese' effect.

What is needed to overcome this is a *shifting heap*. This moves the blocks around as space is allocated and deallocated, thus confining the heap at all times to its minimum required size. You can do this in C, but there are no routines within RISC OS itself to enable you to implement a shifting heap from Basic or Assembler - you have to do all the work yourself.

Fortunately this is not exceptionally difficult, but if you think about it, it does raise some important considerations. For example, with a static heap you can claim a block of memory, assign the address to a variable and then use that variable as a pointer to your heart's content. With a shifting heap you may have no way of knowing whether the block is still at the same address, and so you can't just use a variable as a pointer.

This is not a huge problem, but it does require a bit of discipline from the programmer - no bad thing anyway! Instead of assigning a block pointer to a variable, you simply pass the allocation routine a 4-byte address into which it will place the pointer, and then remember always to get the pointer from this address before accessing your block.

So much for the theory - now for the practice. As with the original memory manager, the routines listed here provide facilities to allocate, deallocate and alter the size of a heap block. The code is different since the Heap Manager can no longer be relied on to help out. We can also take advantage of the fact that if you have RISC OS 3.5 or later, dynamic areas are a better way of claiming extra memory than extending the Wimp slot.

So without further ado, here are the new routines, which perform the same tasks as the corresponding routines in the original memory manager.

```
   DEFPROCallocate(size%,addr%)
   errflag%=0:size%+=8
   IF heap%=0 PROCsetupheap(size%) ELSE
IF size%>free% PROCgetmemory(size%-free%)
   IF NOT errflag% THEN
    !addr%=heapnext%+8
    !heapnext%=size%:heapnext%!4=addr%
    heapnext%=heapnext%+size%
    free%-=size%
   ENDIF
   ENDPROC
   :
   DEFPROCdeallocate(addr%)
   ptr%=!addr%-8:size%=!ptr%
   !addr%=0:free%+=size%:a%=ptr%+!ptr%
   SYS "Wimp_TransferBlock",task%,a%,task
%,ptr%,heapnext%-a%
   heapnext%-=size%
   WHILE ptr%<heapnext%
    addr%=ptr%!4:!addr%=ptr%+8
    size%=!ptr%:ptr%+=size%
   ENDWHILE
   PROClosememory
   ENDPROC
   :
   DEFPROCalterblock(addr%,size%)
   errflag%=0:ptr%=!addr%-8
   s%=!ptr%:IF s%=-size%
PROCdeallocate(addr%):ENDPROC
   IF size%>free% PROCgetmemory(size%-
free%)
   IF NOT errflag% THEN
    free%-=size%:a%=ptr%+!ptr%
    SYS "Wimp_TransferBlock",task%,a%,
task%,a%+size%,heapnext%-a%
    heapnext%-=size%
    !ptr%=!ptr%+size%
```

```
    WHILE ptr%<heapnext%
     addr%=ptr%!4:!addr%=ptr%+8
     s%=!ptr%:ptr%+=s%
    ENDWHILE
    IF size%<0 PROClosememory
   ENDIF
   ENDPROC
   :
   DEFPROCgetmemory(mem%)
   IF rpc% THEN
    a%=page%*(((mem%-1) DIV page%)+1)
    SYS "OS_ChangeDynamicArea",dynarea%,
a% TO ,b%
    IF b%<a% errflag%=TRUE ELSE free%+=a%
   ELSE
    SYS "Wimp_SlotSize",appsize%+mem%,-1
TO new%
    IF new%<appsize%+mem% THEN
     errflag%=TRUE
     SYS "Wimp_SlotSize",appsize%,-1
    ELSE
     free%+=new%-appsize%:appsize%=new%
    ENDIF
   ENDIF
   IF errflag% PROCreport("Not enough
memory",1)
   ENDPROC
   :
   DEFPROClosememory
   WHILE free%>=page%
    IF rpc% THEN
     SYS "OS_ChangeDynamicArea",dynarea%,
-page%
    ELSE
     SYS "Wimp_SlotSize",appsize%-page%,-
1
     appsize%-=page%
    ENDIF
    free%-=page%
   ENDWHILE
   IF rpc% THEN
    SYS "OS_DynamicArea",2,dynarea% TO ,,
a%
    IF a%=0 PROCremovearea
   ENDIF
   ENDPROC
   :
   DEFPROCremovearea
   SYS "OS_DynamicArea",1,dynarea%:heap%
=0
   ENDPROC
   :
   DEFPROCsetupheap(size%)
   IF rpc% THEN
    a%=page%*(((size%-1) DIV page%)+1)
    SYS "OS_DynamicArea",0,-1,a%,-1,128,-
1,0,0,name$ TO ,dynarea%,,heap%;flags%
    IF flags% AND 1 THEN
     errflag%=TRUE
     PROCerror("Not enough memory")
    ELSE
     free%=a%
    ENDIF
   ELSE
    PROCgetmemory(size%)
    heap%=HIMEM
   ENDIF
   IF errflag% heap%=0 ELSE heapnext%=
heap%
   ENDPROC
```

The allocation routine is now a procedure rather than a function. This is because, as I have explained, you now need to supply a location for the routine to place the pointer. So to claim 1K for instance, you would dimension a 4-byte block, for example *store%*, and call the procedure as follows:

```
PROCallocate(1024,store%)
```

The variable which holds the address of the memory location will now be *!store%* and not *store%*. So if you want to get the contents of the word which is 16 bytes from the start of the block, you would use *(!store%)!16*. This is because the memory manager might at any time move the blocks around and alter the value stored in *store%*.

PROCallocate actually allocates 8 bytes more than you request, and uses the extra for its own information. In the first word of the block it puts the block size, and in the second the address of the location where you are storing the pointer (i.e. *store%* in the example given here), so that it can update the value in this location later if necessary. The value actually placed in *store%* for you to use will therefore be block+8, i.e. the first location at which you can actually put your own data.

The other procedures work in a similar way to the original memory manager described in RISC User 7:5. As before, when you call *PROCalterblock* the second parameter is either a positive or negative value giving the amount by which the original size of the block should be altered. When a hole appears in the heap, either by calling *PROCdeallocate* or by reducing the size of a block, all the blocks above the hole are shifted down in memory. If the Wimp slot can be reduced in the process (i.e. if the free memory in the heap is greater than the page size), this is done automatically. Thus the heap only ever takes up the space needed by the currently active blocks, and the size of the application is maintained at the lowest possible level.

A major addition to the code is the use of dynamic areas if the OS supports them (i.e. RISC OS 3.5 or later).

These were described in some detail in RISC User 8:6. To find out which OS is in the computer, you should include the following in the initialisation procedure:

```
SYS "OS_Byte",129,0,255 TO ,os%
rpc%=(os%>&A4)
```

This will set a flag *rpc%* if you have 3.5 or later, enabling the memory management routines to create and maintain a dynamic area instead of altering the application workspace. This has significant benefits for large blocks of memory, as there is a time overhead in paging large application workspace areas in and out of memory as control passes from one application to another during multi-tasking. When you create or alter a dynamic area, memory is allocated in page-sized blocks (normally 4K under RISC OS 3.5).

You could quite easily request separate dynamic areas for each block you need, but that would make it more difficult to write a memory manager that would work on all systems. Also, if you are asking for small amounts of memory but getting back 4K each time, the wasted space could add up after a while. For this reason, I have chosen to have one dynamic area which is treated as a single shifting heap in exactly the same way as the extra Wimp slot space is used if you have an older system.

As before, a few statements are needed in your initialisation routine:

```
appsize%=HIMEM-&8000
free%=0:heap%=0:dynarea%=0
SYS "OS_ReadMemMapInfo" TO page%
```

Also, you need to supply a value for *name$* in *PROCsetupheap*. This is the name that will be given to the dynamic area if there is one, and could be just the application name or any other name you choose.

If a dynamic area is being used, it will have an area number allocated by the OS when it is first created. This number is stored in *dynarea%*. Whenever the area is shrunk, the size of the area is checked and if it is found to be zero, the area is removed. You should also remove the dynamic area if the program terminates either naturally or via an error. If there is a dynamic area in existence then *heap%* will be non-zero, so you should include the following line before quitting, and in your routine which handles fatal errors:

```
IF rpc% AND heap% PROCremovearea
```

This month's magazine disc contains the full set of procedures listed in this article, as well as a small demonstration program which allows you to increase and decrease memory allocation while watching the Task Manager display.

Puzzle Corner

Win a magazine and disc subscription with our new puzzle feature. Puzzle designed by Roger King

The monthly puzzle offers you the chance to win a full year's subscription to the magazine and disc. To enter, send a copy of the completed puzzle to the Beebug offices in an envelope marked 'Puzzle', together with your name, address and membership number. The magazine disc contains the puzzle as a Draw file, and we suggest that you use Draw to complete the puzzle on the screen, then print out and send us your solution. The closing date is 8th December.

DoubleCross

Place the 48 letters shown below into the grid to complete all of the words. There are no plural words in the grid.

A B D G L O
A B D H L R
A C E I L R
A C E I L S
A D E I L T
A D E I M V
A D G L M Y
A D G L M Y

© Rex Puzzles

A Closer Look at the Toolbox (Part 2)

Tony Howat concludes his exploration of Acorn's new programming Toolbox

Last month we covered the construction of a resources file using ResEd for our example Toolbox application, *DeskFont*, a desktop font changer for RISC OS 3.5 and later. We have now come to a stage where we should be writing the code to hook onto events from the object we built.

Linking the main code to the user interface using the toolbox is a doddle compared with RISC_OSLib's traditional template-based approach. Unlike its predecessor, the Toolbox has a consistent and well-defined API. In other words, once you're used to working with one class, the rest should come easily. In this program I'm using C for writing the client application, but you can in fact use any language via a set of Toolbox SWIs; however ResEd and ResTest are presently only available as part of Acorn's C/C++ package.

The Toolbox API centres around message handlers and 'methods'. Methods are routines which alter a class or a component in a window. In this program, we use a FontMenu method to set the currently-selected font, and we have already referred to our use of components in the icon bar menu.

Our *main()* routine begins by initialising the Toolbox with *toolbox_initialise()*. This call does all the Wimp initialisation you would have to do normally, which explains its use of ten parameters:

```
    if ((e = toolbox_initialise (0, 310, message_l
ist, event_list,
    "<DeskFont$Dir>", &mfd, &id_blk, NULL, NULL,
NULL)) != NULL) {
    raise_error (e);
    exit (1); /* Fatal */
}
```

The first parameter is for flags, which can normally be left as zero. The next four parameters of the call cover the Wimp_Initialise SWI, and supply a Wimp version number (it must be greater than or equal to 310, as the Toolbox will not run on earlier versions), a message list and an event list. *message_list* and *event_list* are both arrays containing one zero element; this causes all messages and events to be delivered by default. The fifth parameter specifies the resources directory, and the sixth is a pointer to a global variable of type *MessagesFD*. The Toolbox initialises the message system and puts the message file handle into the specified variable. A Toolbox application must have a messages file, containing at least one entry with the tag *_TaskName*. The following parameter is a pointer to an IdBlock structure, which is used for returning information to the client after a Wimp_Poll call. The final three parameters are used to return the current Wimp version, the task handle and the sprite area pointer. DeskFont does not need this information and so the parameters are set to NULL.

The next stage is to initialise the event handler and set our Wimp_Poll mask. This is done through the calls:

```
    event_initialise (&id_blk); /* this leaves us
our id */
    event_set_mask (1+256);
```

The mask passed is identical to that which you would pass to Wimp_Poll.

Now we come to attaching handlers to events and messages. Using *event_register_toolbox_handler* and *event_register_message_handler* we can hang functions off events from the Toolbox and Wimp respectively.

All these functions are similar in their operation, and so we only need explain a couple of our handlers, the first being *gotafont*, which handles selections from our FontMenu. It is attached to the inventively-named *FontMenu_Selection* Toolbox event with the following line:

```
    event_register_toolbox_handler(-1, FontMenu_Se
lection, gotafont, NULL);
```

The first parameter gives you the option of attaching a handler to a specific ObjectId. In this case, we don't care where the event comes from (as there is only one object in the resources which could feasibly send a *FontMenu_Selection* message) and so the ObjectId is set to -1, which will attach the handler to all objects. The second parameter is the message *FontMenu_Selection*, which is generated by the FontMenu class when a specific font in the font menu is clicked upon. The null parameter covers the handle, which can be used to point to a structure in more complex applications.

The actual handler function, *gotafont*, looks like:

```
    static int gotafont (int event_code, ToolboxEv
ent *event_block,
                         IdBlock *id_blk, void *h)
{
    FontMenuSelectionEvent *fmse=(FontMenuSelectio
nEvent *)event_block;
    change_desktop_font(fmse->font_id);
    return 1;
}
```

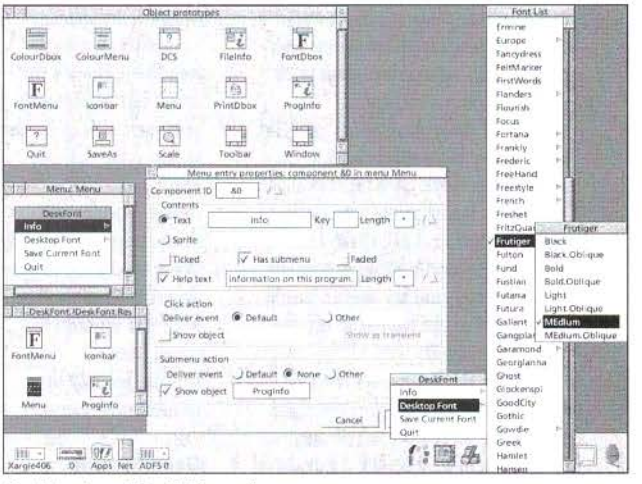
As you have probably realised, *void *h* is the handle parameter we specified when attaching the event. *IdBlock* is a structure that gives you details of exactly where the event came from; we don't actually use it here, so it is explained later. *event_code* will equal *FontMenu_Selection*; it gives the programmer a means of telling events apart if many messages are given the same handler. The value we actually use is *event_block*, which is cast to a pointer to a *FontMenuSelectionEvent* block. This way we can identify the parts of the data returned from the Toolbox with names and types relevant to a *FontMenu* selection event. Most events have a similar block definition, so you are saved from messing around with offsets etc. One element of the *FontMenuSelectionEvent* structure is *font_id*, an ASCII string containing the name of the selected font. We call our own routine to do the font change, and then return 1 to the Toolbox. This is important: returning a non-zero value claims the event (it won't be passed on to any other handlers).

The second handler we will cover is *setup_values* which attaches to the menu class event *Menu_AboutToBeShown*, and sets up the FontMenu dialogue so the current font is ticked. As I mentioned earlier, we would normally use *FontMenu_AboutToBeShown* but for a bug in FontMenu. Still, it acts as an example for the use of the *id_blk* and another method, *menu_get_sub_menu_show*. The handler is attached in the same way as our FontMenu_Selection handler, and looks like this:

```
    int setup_values (int event_code, ToolboxEvent
*event_block,
                      IdBlock *id_blk, void *h)
{
    ObjectId fmid ;
    char buffer[40];
    menu_get_sub_menu_show(0,id_blk->self_id,MENU
_FONTMENU,&fmid);

    if(_kernel_getenv("Wimp$Font", buffer, 40) ==
NULL)
    fontmenu_set_font(0, fmid, buffer);
    return 0;
}
```

The IdBlock structure supplies the Toolbox ids of not only the current object (*self_id*) but also the parent (*parent_id*) and the ancestor (*ancestor_id*). The parent object is the object which caused the creation of an object; for example, a menu's parent would be the window it is attached to. The ancestor is the parent's parent. In this case, only the self_id is needed. We can't get the id of our sub-FontMenu (remember this handler is called by the icon bar menu) from id_blk; the font menu is a child of the current menu. We need to be specific and state which child of the menu we want to know about, as each component



DeskFont and RedEd in action

(menu entry) may have a child. So we use a menu class method to find the child of the *Desktop Font* component in our menu. We call *menu_get_sub_menu_show* supplying flags (which we leave as zero), our object id, the component id of the menu object we are referring to, and finally a pointer to an ObjectId variable to which the Toolbox writes the information we need.

Once we have the ObjectId of the font menu in *fmid* we can go ahead and read the current desktop font, and then call a fontmenu method, *fontmenu_set_font*, to set the currently-selected font accordingly. Finally we return zero to the Toolbox, so we don't claim the event (as other parts of the code may theoretically be interested in it).

The rest of the program is written in the same way: short event handlers attached to messages. The Toolbox does most of the work for you, so you are left to concentrate on the actual core of what you are doing.

continued on page 24

Power to your Desktop

Improve your desktop dexterity with John McGregor's hints and tips

How many extra miles a year does your mouse do? We present here a number of time- and travel-saving short-cuts which can reduce mouse movement and speed up your interaction with the desktop environment.

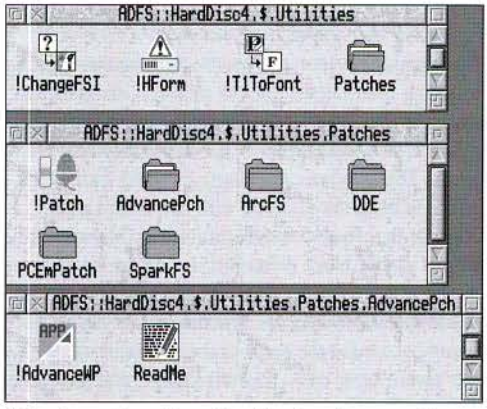
Most of these hints work on RISC OS 3.10 and beyond, though a number also work on RISC OS 2.00. There are a few that only work on RISC OS 3.50 or 3.60; these are noted as they occur. Why not sit at your computer and try them? You'll be surprised at the saving in effort and mouse travel!

Most of the short-cuts revolve around the Adjust button: the right-hand of the three buttons on any RISC OS mouse. This third button is unusual (PCs generally only have two buttons) and is generally used by RISC OS to modify the behaviour of the Select button in some way.

Let's look first at a window. As well as bringing it to the front by clicking Select on the title bar, you can also bring it to the front by clicking on the Toggle (top right) or Adjust Size (bottom right) icons. If you use Adjust instead of Select to drag a window around by its title bar, you'll see that, instead of coming to the front, it will retain its position in the window stack.

Most windows have scroll bars. At each end of a scroll bar is an arrow which you can click with Select to move the window viewer, exposing the contents in that direction. However, if you overshoot you might think that you have to go to the opposing arrow and click there. Actually, if you use Adjust instead of Select, the direction of movement is reversed, so you can move a viewer up/down or left/right from the same arrow. The same applies to clicking with Adjust in the area of the scroll bar 'well' which is not occupied by the slider: it does the opposite to Select.

Lastly, for basic windows, there's the scroll bar slider itself. If you start a drag on the slider using Adjust, you'll notice that the mouse pointer disappears temporarily. While you keep Adjust down, you can move *both* the window's scroll bars simultaneously by mouse movements.



This shows the alternative directory icon used in RISC OS 3.50 when a directory is open. Note also the effect of using System Font instead of an outline font.

Getting more adventurous

So far we've looked at behaviour provided by the Window Manager. However, there are two more bits of useful functionality which may be provided by the application owning the window. To try these out use Edit (or DeskEdit). Reduce the size of the window, and then click on the Toggle icon at the top right with the Shift key held down. Instead of expanding to cover the screen, it leaves the icon bar uncovered (and don't forget that Shift-F12 can be used to bring the icon bar to the front and move it back again). Secondly, many editors interpret a click with Adjust on the Close icon to mean 'close the window, and open a filer viewer for the directory that the file being edited is in'. Try this with Paint or Edit, for example.

This leads us neatly into taking a more detailed look at a filer viewer. Once again, the Adjust button is used to extend its functionality. If you want to select all but a few files/directories in a viewer, there are two ways of doing it quickly. The first is to use the 'Select all' menu option and then to click Adjust on the ones you want removed from those selected. You can also use Adjust to add to the selection. The second is to drag a box to a size that includes everything you want, and then again use Adjust to remove any you don't want selected.

If you find that your desktop becomes cluttered, then using an Adjust double-click instead of Select will help. Like Select, it will run the file/application or open the subdirectory, but it will also close the viewer in which you clicked. When used together with an editor that supports the Adjust-Close behaviour just mentioned, it's easy to keep a clear desktop with no extra effort. Be careful, though: if you have dragged an application or file onto the

pinboard, double-clicking on it with Adjust will remove the icon.

You can also use Adjust and the Shift key to change what happens when you drag something from a filer viewer. If you hold down Shift, you will move objects rather than copy them (if the source and destination are on the same drive, the filer will try to rename the object before actually reading it in and writing it to the new location). If you use Adjust instead of Select, the viewer you dragged from will close once the drag is complete.

If you have a Risc PC 600/700 or an A7000, you may have noticed that when you double-click on a directory to open it, the icon you clicked on changes to show an open folder. If you now double-click on this icon again with the Shift key held down, all the subdirectory viewers which it contains will be closed.

Many applications also support Adjust, and shifting keys like Shift and Ctrl, to provide direct access to certain facilities. Experiment, or go back and read the manual fully! As an example, the zoom dialogue box in Draw has up- and down-arrows for both values. Clicking Select performs the action you'd expect, but clicking Adjust performs the opposite action, saving again on mouse movement if you click too many times.

Expanding your view

Even with all these facilities available, there comes a time when the desktop is just not big enough; what can you do then?

The simplest answer is the one for Risc PC owners (or those with a graphics enhancement card): change into a larger screen mode! Adding VRAM to achieve this can be a worthwhile investment. With 2Mb of VRAM, a Risc PC can display 1280 * 1024 in 256 colours with square pixels, or 1600 * 600 with rectangular pixels. (If you know what you're doing, it's even possible to extend your Risc PC's monitor definition file to include a desktop of 1600 * 1200 square pixels in 256 colours, though this mode is not provided as standard.) For serious work it's worth considering a monitor whose screen is larger than the typical 14" (diagonal). Few users of a 17" monitor such as Acorn's AKF85 ever want to go back to a smaller screen.

For those occasions where making the screen larger is not really possible, the approach then changes to using a mixture of useful utilities and a methodical working style. Does that window need to be open? If it's a filer viewer, drag the objects you actually need onto the Pinboard and close the viewer. If you do need the window open but don't need it for a while, iconise it (hold down Shift as you click on the Close icon). While a window is iconised, you can get at the menu for that window by holding Shift down as you click Menu on the 'iconised window' icon on the Pinboard.

If you have applications you use regularly, or files which you frequently alter, then put them on the Pinboard and arrange for them to be put there automatically when the computer starts up. If you find the standard Pinboard limiting, there are several alternatives available which do more. There are also quite a few related utilities intended to help here: one such which is not strictly a backdrop is Martin Würthner's AppDock, which provides a strip of icons, each of which can be used to launch a file or application. You can also bind function keys to these icons, allowing you to press a function key to load a file or application. Along similar lines, Beebug's new MenuBar utility lets you store your commonly-used applications and files in menus which drop down from the top of the screen.

Another class of useful utility attempts to provide 'virtual' desktop screens. There are three or four around, including Prospect, featured on a RISC User disc earlier this year (8:7). These all work by manipulating the positions of windows to place them below a backdrop or off the displayed area of the screen. Then, by clicking icons or using a keyboard shortcut, you can exchange one group of windows which were on-screen for another which were previously not visible. Unfortunately, these applications are quite difficult to write to cover every possibility, and most of them have some quirks. If you can live with the quirks, then you can have a 'virtual desktop' some ten times the size of the screen. There are limitations, of course; the main one being that a window still can't usefully be any larger than the real screen.

Clicking Shift-Menu on an iconised window brings up its main menu.

Although the outline fonts used in the desktop in RISC OS 3.50 and beyond are undoubtably a demonstration of one of the traditional strengths of RISC OS, you may find that changing the display back to the standard System font allows smaller text to be used, again saving on the overall size a window needs to be to display the same amount of information.

In case of disaster, read on...

Finally, let's take a look at the unthinkable: what happens when an application fails and you think you're going to lose those modified files you've been intending to save for the last hour (or several)? Although some failures can ultimately cause a domino effect which results in widespread chaos, most are on a much smaller scale because each application that is running usually has an area of memory to itself and doesn't affect other applications directly.

Usually, one application will fail and exit. You may lose any unsaved work in that application (though, to combat this, applications like Paint and Draw will attempt an emergency save operation before quitting), but the rest of the desktop will be fine. Of course, it's still a good idea to save anything else which needs saving, just in case the application which failed has managed to affect some common part of the system.

However, at other times the problem is not that an application exits, but that it won't exit. It may even have stalled the desktop from multitasking. In the majority of cases, nothing's actually wrong when this happens; an application is doing something time-critical or processor-intensive, and decides it's best to do it more quickly at the expense of an interruption to the multitasking environment. In particular, most applications which know they're going to embark on some lengthy process will change the mouse pointer to an hourglass, and may even add a numerical display to indicate an estimate of how nearly complete the process is. However, sometimes an application really does go wrong.

There are two things you can try to get that application out of memory. If you do still have control in the desktop, bring up the Task Manager display (by clicking on the Acorn icon at the bottom-right of the screen or choosing 'Task display' from its associated menu), click Menu over the ill-fated application, and then click Quit. This may work.

With RISC OS 3.50 and beyond, a Watchdog facility has been built into the Window Manager. By pressing Alt-Break, you can force the current task to be interrupted and an error box will be displayed by the Window Manager asking whether you want to shut down that task. The Watchdog facility should only be used as a last resort, though; it will stop an application without going through the usual close-down protocol. The Watchdog also allows you to cycle through all the tasks currently loaded, just in case a different task had control at the time the Alt-Break keystroke was recognised. (For those who do not have the benefit of RISC OS 3.5, the BugBuster module from RISC User 6:1 achieves a similar effect.)

A clean squeak

I began by mentioning the distance the mouse travels, and I'm going to finish with a hint for the mouse. It's easy not to notice the gradual degradation in mouse performance which arises as the ball in the base of the mouse gradually picks up muck and other debris. Using a mouse mat helps considerably by providing a surface suited for the ball, which should also be cleaner than the rest of the table top. However, there's no real substitute for periodically cleaning the mouse.

A Closer Look at the Toolbox

continued from page 21

There are three more handlers in DeskFont, to deal with menu selections, Toolbox errors, and Wimp quit messages. They should be self-explanatory by now, or at least the Toolbox-specific parts should be. So, I will leave you to read through the source on this month's disc. Remember, once you get the gist of how Toolbox programs are constructed and implemented, the learning curve levels out nicely.

During the testing of DeskFont I found another bug in FontMenu, caused by mis-handling of Adjust clicks. Thankfully this problem is fixed in version 0.17 of FontMenu, which is supplied with the C/C++ update pack, and is also on the magazine disc.

Conclusions

The Toolbox is a great improvement over the previous RISC_OSLib, especially in terms of usability, but it does lack some of the more useful parts of the older library (for example flex and alarm). A stand-alone flex library is supplied with the first C/C++ update disc from Acorn, which is detailed below. There are definitely some things the Toolbox is good at: panes, for example. They can be attached to a window very simply, and all the calculations and redraws are managed by the Toolbox itself. *Gadgets* makes things like sliders as straightforward as clicking a couple of buttons in ResEd. The major problem with the Toolbox is its size: single applications may be small, but the support modules add up to 220K. Using the Toolbox at present also introduces problems of having to distribute and ensure the correct installation of the modules and their associated baggage. This will become less of a problem as more applications use the Toolbox, and once ROMs containing the Toolbox are released for all machines, the problem should disappear completely.

The sample application described in this article is included on this month's disc. The C source code has been included, and is plastered with additional commentary. You can also examine the Resource file using the full ResEd if you have Desktop C v5, or the demonstration version of the program which was distributed to Clan members when the C/C++ package was released.

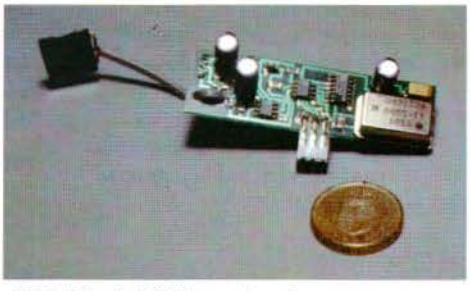
Acorn C/C++ was updated soon after its release. An update pack can be obtained via the Internet by ftp from ftp.acorn.co.uk as:
/pub/riscos/releases/Cupdate1.arc
or from Acorn Direct in return for a £5 handling charge. Their address is 12 Dennington Road, Wellingborough, Northants, NN8 2RL.

Music Composition on Acorn Machines

Andrew Rawnsley blows the trumpet for Acorn music software

Hands up everyone who's got a record, tape or CD collection. Now, keep those hands up if you've thought of pursuing this interest on your Acorn. You haven't? It's surprising that in Acorn's attempts to explore the high-end, niche and professional markets, it has kept strangely quiet about its machines' musical capabilities. Indeed, recent hardware and software innovations have put Acorn ahead of all the competition, but music is still an alien experience for many users.

Audio Dynamics' powerWAVE card



ESP's Minnie 16-bit sound card

MIDI. There, I've said it. If you haven't turned the page yet, then either you're one of the initiated few, or you're hoping I'm going to explain myself. Well, yes, I am.

The MIDI concept

Traditionally, the main use of MIDI (which stands for Musical Instrument Digital Interface) was for communication between an external electronic keyboard and a computer. Whilst very useful to a minority of people, achieving acceptable playback of your masterpiece required an expensive keyboard on top of the MIDI interface and software.

In a bid to unify the MIDI world, a new standard was defined: General MIDI (GM). This included a set of 128 voices (instruments) which should be common to all MIDI devices. The result was that pieces of music composed on one keyboard or computer system could be played back on any other, independent of the computer or keyboard.

Unfortunately, you still had to invest in an expensive keyboard if you wanted anything like reasonably realistic playback.

Manufacturers of the voice sets saw a great potential market for the instruments alone. By not having to manufacture a complete keyboard, they could offer their instrument sets at a vastly reduced price. By connecting these to a MIDI interface, either externally as a voice box, or as a 'daughterboard' (an expansion card for existing MIDI interfaces), stunning playback became a reality for the average user; and for the more professional user, having voice sets permanently available that would normally have cost well into four figures allowed for the purchase of a cheaper keyboard. The keyboard would be used for input, but playback would be via the up-market voice bank.

As a result, thousands of pieces of music have been written using the GM format. Because the voices are resident, the files don't need to contain all the samples, and several hours of music can be stored on a single floppy disc!

Music on your Acorn

MIDI may seem like a distant and rather esoteric subject to Acorn users who are new to the music scene. Every Acorn machine is equipped with eight channels of stereo sound, and you may wonder what all the fuss is about with MIDI if the machine can do this much as standard.

The answer is that for serious composition, Acorn's internal sound system is seriously under-powered. If you want your music to be compatible with every Acorn machine, then you're limited to 8-bit sound. This lacks clarity and colour, sounding thin and dead. Recent innovations have enabled the playback of 16-bit sound, but only on the newest Acorn machines. Don't forget, also, that because no voices are provided in ROM, the quality of the

music will depend on the samples the author has used. Even if you splash out on a true 16-bit system, playing back a piece of music created using dodgy samples recorded on an Amiga (an all too common situation) will sound awful.

You are also limited by the 8 channels; that is, 8 instruments playing at once. For electronic pop and dance music, this may be fine, but for classical, instrumental and orchestral works, it's ridiculous. The GM standard defines 16 channels, and the ability to play 32 notes at any one time. To put this into perspective, you can have two of each orchestral instrument (usually the first and second for each), and still have room for a percussion section.

Oh, and don't forget that the MIDI voices will be sampled in 16-bit stereo at 44.1kHz, and occupy up to 6Mb of ROM!

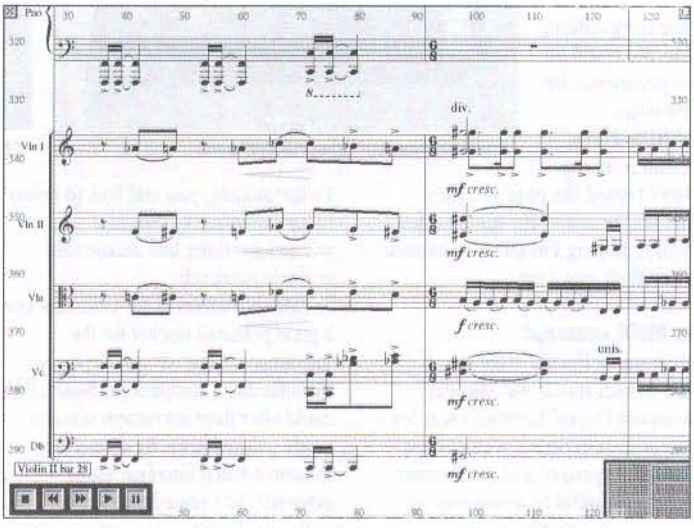
Hardware

There are really two alternatives for GM music creation on the Acorn, with cards available for everything from an A3000 to a Risc PC 700. The premier product until recently was VTI's VTX2000 music card, but this has now been discontinued because some of the parts became unobtainable. If you can get hold of one secondhand, however, it certainly does represent state-of-the-art music-making.

More recently, Audio Dynamics have upgraded their PowerWAVE range of cards with the PowerWAVE XG (reviewed last month). This uses a Yamaha XG board (XG is an enhanced version of MIDI) and produces a wide range of stunning, professional quality sounds. VTI are also planning to develop a replacement for the VTX2000 based on a Yamaha card.

If these top-of-the-range cards are a little out of your budget, there is the standard range of PowerWAVE cards available at around £200 for every machine. If you don't want the voice set, then the two MIDI interfaces are available for less.

The standard PowerWAVEs use the Ensoniq voice set, which doesn't sound so good on instrumental and orchestral tracks, but which still makes other competing cards look rather tame. However, the cards can be upgraded by adding a different daughterboard such as the Yamaha XG or indeed any other standard PC-style plug-in board that becomes available in the future.

Finally, for people on a budget, Acorn and ESP are working on a software MIDI solution. It'll probably still require a 16-bit sound card (around £50) and a minimum of 2Mb, or more probably 4Mb, of RAM. Whilst the quality won't be so good, and the samples will be on disc, rather than ROM, this will bring MIDI to almost everyone.

A tiny portion of an A3-sized orchestral score on view in Sibelius 7

Software

There is quite a selection of music software available on the Acorn platform, and for the creators of orchestral or classical instrumental works, one of the Sibelius family would be a good choice. There are one or two flaws, but for composition it is probably your best choice. Clares also do a good selection of software, and their products are my current personal choice; but for one reason, and one alone: MIDI export.

Sibelius doesn't, at present, support the saving of music as MIDI files. This means that in order to play music created in Sibelius, you need a full copy of the package installed on your machine. This rules out distribution of your work electronically, as few people (on a global scale) own Sibelius, it being available only for Acorn machines. The lack of a GM export facility really restricts the program to personal use, or to the production of instrumental scores, and it was for the latter purpose that Sibelius was really created. Sibelius Software says that version 3 will allow GM file export.

Sibelius

Despite my criticism above, Sibelius represents an important milestone in Acorn music. It is a package which can inspire awe, particularly in its version 7 guise; something that's not often said about Acorn software. Whilst all versions offer MIDI playback, Sibelius 7 offers special 'espressivo' algorithms for making instrumental music sound natural, as if it were being played by

real human players with feeling, rather than an inanimate computer. Tests with supplied music by Chopin and Debussy were impressive, with the rhythm being pulled around by Sibelius to suit the style of the piece. The degree of expression can be adjusted by simply choosing a menu option.

Sibelius' primary aim is to provide the user with an easy, yet exceptionally powerful, way of creating scores for printing and publishing. Of course, it uses standard musical notation, and is probably best suited to instrumental and classical scores. If you're going to want a high quality printed score at any point during the creation of your music (and I stress, high quality) then the Sibelius family is probably your best bet. You can print whole scores or separate out instrumental parts, so there'll be no more writing out parts by hand the night before the performance!

The package uses a slightly non-standard full-screen editing approach, which remains in the desktop but doesn't permit the window to be resized. The philosophy is that if you're serious about what you're doing, you'll want as much of the page visible as possible. This is perfectly reasonable, and you can swap back to the desktop at any time if you need to. The page will then be displayed in a window, permitting the scale view to be adjusted, but editing in this mode isn't possible.

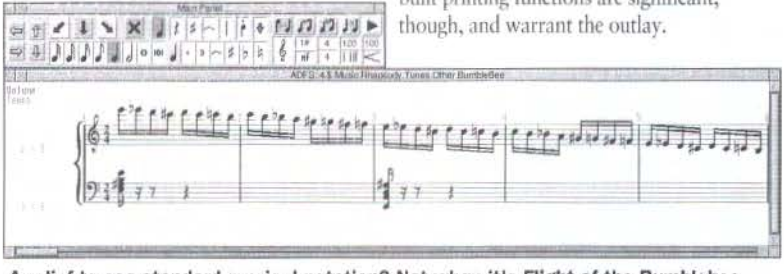
In tests, I found creation of music in Sibelius to be faster than in any other package. This was partly due to the ease of use, but the clear, uncluttered on-screen display made life a lot more pleasant. Unfortunately, these advantages were hampered by the lack of MIDI file export.

When Sibelius gains MIDI export, it will become my first choice for music creation. Saving a piano sonata with the appropriate expression would be wonderful, since few packages on any platform can produce such 'real' music.

Unfortunately, at over £500, Sibelius 7 is a little out of the price range of many users, and some of the more impressive MIDI effects aren't available in the more affordable Sibelius 6. Sibelius Software is in the process of expanding its range, with versions of the software priced to suit the target audience. Hopefully this will bring the full MIDI support to the average user.

Music solutions from Clares

There are really four products which make up Clares' primary music line-up. Rhapsody 3 and ScoreDraw use traditional notation for music creation, whilst Serenade and Rhythm-Bed take the MIDI Sequencer, piano roll approach.



A relief to see standard musical notation? Not when it's Flight of the Bumblebee played at full whack by Rhapsody!

Rhapsody 3 and ScoreDraw

These packages are priced for home and educational users, unlike the Sibelius family. Whilst they offer fewer professional features and are not really suited to those creating large orchestral scores, the packages do offer a reasonably high quality of music and score production for significantly less than the price of Sibelius 7!

ScoreDraw is only used for printing scores, but produces much more impressive results than the standard printing tools in Rhapsody. It will produce Draw files, and can adjust spacings and scaling.

Rhapsody is used for the actual creation of the music, and it accepts real-time MIDI input from a keyboard, or manual note entry. Once a piece has been entered you can adjust and tailor your music to suit. Expression is really only available as direct tempo changes and volume adjustments. You'll have to enter these manually, as the program simply plays the music back, it doesn't 'think' about what it's doing.

The package certainly offers plenty of effects and tools, and is probably ideal for the hobbyist with some musical background and experience. However, it is somewhat lacking in fine control, which might put the more up-market user off.

If you are considering Rhapsody, then you should also budget for ScoreDraw. I didn't, and ended up having to buy it separately later, only to find that I needed upgrades to use it properly! The improvement over the in-built printing functions are significant, though, and warrant the outlay.

One important feature of Rhapsody is the ability to import MIDI files and produce scores from them. Admittedly, a little touching up was required, but with half an hour's work I was able to locate a favourite song of mine on the Internet, load it into Rhapsody, and print out a simple score. With the aid of this score, I can now play my own interpretation of the piece on the piano! Whilst this might seem to be 'cheating', imagine if you had created the piece in a MIDI sequencer, and then found yourself needing an instrumental score...

Serenade and Rhythm-Bed

Serenade, aimed solely at the MIDI market, is the only Acorn sequencing package still being updated and maintained. Creating music in

sequencing packages is unlike any process used by a traditional composer, as the software is concerned only with the playback of the music, not what it looks like on the screen. Indeed, Serenade offers no printing facilities because that isn't its job.

PRODUCT DETAILS

Product **Sibelius 6**
£179 ex. VAT

Sibelius 7 Student
£495 ex. VAT

Sibelius 7
£888 ex. VAT

Supplier Sibelius Software
75 Burleigh Street
Cambridge CB1 1DJ
Tel. 01223 302765
Fax 01223 351947

Product **Rhapsody 3**
£85.06 ex. VAT

ScoreDraw
£52.72 ex. VAT

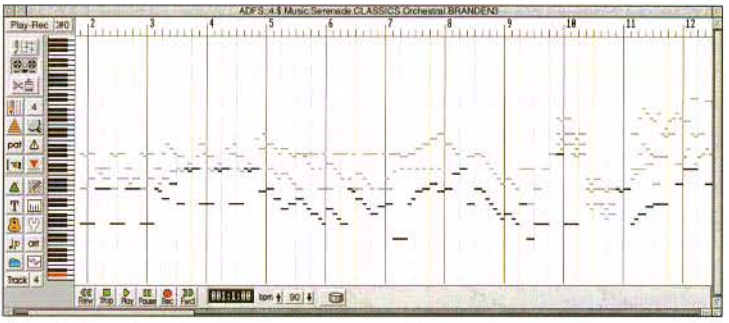
Serenade
£85.06 ex. VAT

Rhythm-Bed
£42.51 ex. VAT

Supplier Clares Micro Supplies
98 Middlewich Road
Northwich
Cheshire CW9 7DA
Tel. 01606 48511
Fax 01606 48512

Product **PowerWAVE XG**
Supplier Audio Dynamics
10 Durnford Close
Norden
Rochdale OL12 7RX
Tel. 01706 868803
Price PowerWAVE 30 XG £233 ex. VAT
PowerWAVE 50 XG £249 ex. VAT
PowerWAVE 50 XG-S £299 ex. VAT

Product **Risc PC Sound Upgrade Card**
Supplier Acorn dealers
Price £59.95 ex. VAT



Brandenburg 3, no less!

A piece of music is represented like a piano roll. Notes are displayed as rectangles, with the horizontal length representing the length of the note, and its vertical position on the page representing pitch. For example, a minim middle-C (on the piano) would be represented by a long bar approximately half-way up the 'page'.

Serenade aids the transition from standard notation to this sequencer style by displaying a piano keyboard down the left-hand side of the main window. This allows the user to quickly understand the relationship between the visual representation and the true sound, and also makes it very easy to deal with keyboard music!

This style of editing is ideal for modern and 'pop' composition, where the music is not made up of orchestral instruments in particular keys, but of drum tracks and note progressions which sound good together. Indeed, to create a piece of music in Serenade, you don't need any formal musical background, just a good ear!

A useful addition to Serenade's feature list is the guitar window, which allows you to add chords and notes based around the instrument's strings. Admittedly this isn't a lot of use if you're not at all familiar with the instrument, but if you are, then you can build up accompaniments and backing tracks very quickly indeed.

Finally, Serenade can work together with Rhythm-Bed to give you a flexible drum sequence editor. If you play back a tune from Serenade, with Rhythm-Bed loaded and the link turned on, then the latter package will handle all the drum tracks, allowing you to quickly try out different styles. Once you've produced your final drum track, you can export it directly back into Serenade to produce a single MIDI file containing your masterpiece.

Interestingly, much music composition under Windows and on the Mac takes place in Sequencers as opposed to traditional score-based packages, to the extent that many PC sound cards come with a sequencer bundled in!

Conclusions

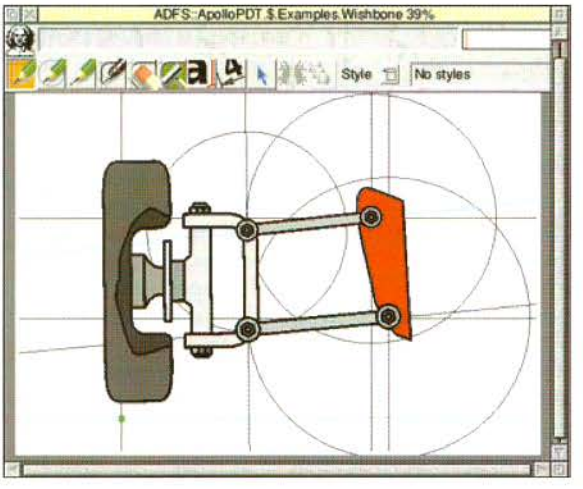
Provided you don't need MIDI export, for classical and instrumental compositions, Sibelius cannot be beaten; and by the time you read this, the package is likely to have advanced even further! However, for modern/pop music, I have to say that Serenade would be my first choice, but it isn't quite up to the standard of equivalent PC alternatives, so if you have a PC card with suitable sound drivers, Cakewalk Pro for Windows might be more up your street (provided you can afford it...).

Finally, Rhapsody 3 is an excellent all-round package which might not be up to Sibelius' standard for notation, or Serenade's for full MIDI control, but certainly fits the bill if you're looking for a one-stop music solution without breaking the bank!

Apollonius PDT

Alan Highet reviews an intuitive new CAD package

There is only a handful of CAD packages available on the Acorn platform, and they range in scale from over £500 right the way down to the software provided with the machine (I have used Draw many times to produce small working drawings for our construction department). They all work in very much the same way, with the user specifying what type of line to draw and where to draw it. The higher-end packages give you varying degrees of help by providing snaps (the cursor jumps to the nearest point or line) and some information about line length and position, but eventually you have to make a decision and put pen to paper, so to speak. From then on you can move the object, rescale it or erase it altogether, but it is still a single, fixed object with no relationship to any other object except in the eye of the user.



This is where Apollonius PDT, or *Parametric Design Tool*, comes in. In CAD terms, parametric means that every object has a relationship to every other object. This is something that is normally only found on high-end packages for other platforms, and it has great implications for designers. It means that a small change in one area will be instantly reflected throughout the drawing, and could possibly highlight a problem that would otherwise have been overlooked.

Apollonius appears to run happily on a 1Mb machine and, at a pinch, will run from a floppy but, like most software, it benefits from more memory and a hard disc. As a CAD package, it has one of the simplest user interfaces I have ever seen. Now, before you all lose interest because it hasn't got all the bells and whistles of other packages, let me explain why more isn't always better.

I have been using Autodesk 2.0 on my PC card, and if you want to see a modern graphical interface with hundreds of pretty icons, then look no further. Don't get me wrong; the program does everything except make the tea, but as for being easy to use it scores only 2/10. Every single movement needs a click on an icon, with some objects needing to access two or three different toolbars, which greatly hinders creativity.

Apollonius is the complete opposite with only eleven icons, of which only three (line, circle and point) are required for drawing all construction lines. A fourth is used for inking in the drawing. The approach to constructing a drawing is fundamentally different from most other software.

Back to the drawing board

A simple example will demonstrate the powerful user interface, so I will take you through the construction of an 80mm x 60mm rectangle with 10mm chamfered corners (see figure 1). The default document starts with a vertical and horizontal line through the origin. We won't use these for our rectangle, but will instead set up some parallel lines 30mm away.

First, we select the line tool and then move over the vertical line supplied as default. The mouse pointer now has a line underneath it to show what is under the pointer, and the status line at the very top of the screen will give us information about the line.

Click Select on this line and move away to the right, and a parallel line will follow the mouse pointer. We could just click anywhere, but I want to be specific so I type 30 and press Return. This is the first side of the rectangle, and to get the opposite side we repeat the exercise, but this time we select the line we have just drawn and produce a parallel line 80mm to the

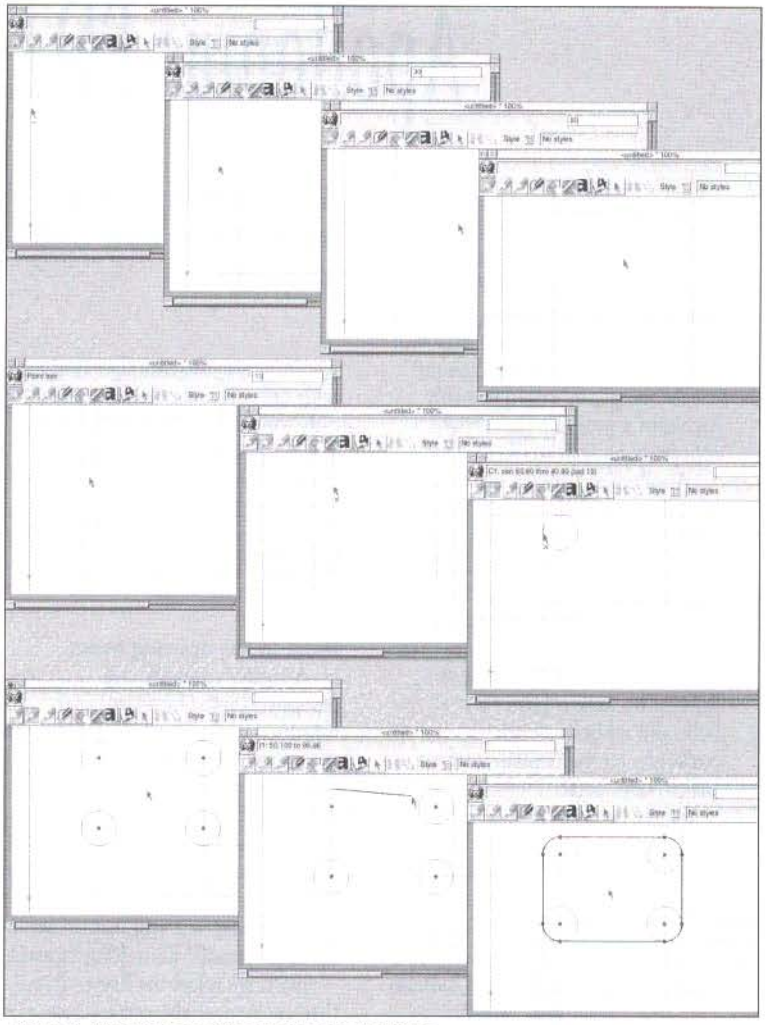


Figure 1. Creating an object using related lines.

right. We could just as easily choose the original line and move it across by 110mm, but this would change the way the lines relate to each other, which I will explain later.

By now you will have realised that the top and bottom of the rectangle are produced in exactly the same way. Next, we need centre points for the four corner radii, and so we produce four more lines parallel to the four sides of the rectangle. These need to be 10mm inside the edges, and again need to be copied from the rectangle sides and not from the origins.

Now it is time to select the circle tool and click on the intersection of two of the inner lines (the pointer will show an X underneath, denoting an intersection). As we move the pointer away, a circle appears. Move the pointer horizontally towards the outside edge, and when the two lines meet, a cross will appear under the pointer and the circle outline will turn from blue to black. Click Select, and a circle will be drawn with a radius of 10mm. (I could also just click on the centre and enter 10.) This is then repeated for the remaining three corners in the same manner.

Finally, the actual outline needs to be drawn, so we select the ink tool. Move the pointer over an intersection of lines on the outline, and a cross will appear under the mouse pointer. Click Select to start drawing, and a rubber-banded line will appear. As we move around the outline, the software offers all the various routes the line could take, because it doesn't yet know which construction line to follow. With careful movement of the mouse, an outline is easily achieved. On returning to the starting point, the ink tool will recognise it and stop drawing. The construction lines can be hidden with a press of a function key, and the drawing is finished.

So far, apart from ease of use, there is nothing startling in what we have done; but the clever part is that all the lines within the drawing are relational to each other. For instance, if we choose the Select icon and click on the first vertical construction line which we drew, the measurement we specified appears in the writable icon at the top right of the screen. Delete this before entering 50. The whole drawing will now move 20mm to the right because all the vertical lines were specified in relation to this line. If we just wanted to widen the drawing rather than moving it, then we would increase the dimension for the rightmost construction line instead. You do

not need to remember any of the relationships because all the information about any line will be shown at the top left of the screen as the mouse pointer moves over it. There are also undo and redo facilities, so mistakes are easily rectified.

Variable relationships

This is all very well for a simple drawing, but, in practice, remembering all the relationships would be very difficult, so the program lets you specify variables. In the example, I could set the variables *length=80* and *height=60* but, more usefully, I could say that *height=length*0.75* and *chamfer=length/8*. Therefore, to scale the object up or down whilst retaining the same proportions, I only need to alter the variable *length*. A selection of mathematical functions such as COS, TAN, SIN, DEG and MOD is already provided, and quite complicated formulae can be used if some thought is given to the relationships within the drawing prior to starting it. Distances may also be expressed as the distance between two existing points, as each point, line or circle is given its own unique number. This enables a plan view to be constructed quickly by specifying points on existing elevations.

The icons on the toolbar that I haven't mentioned are the rubber, which is self-explanatory, the hatch tool, which is not yet implemented, the text tool and the dimension tool. Text may be placed horizontally at any point or be made to follow a line or circle, and is fully editable at all times. Any outline font may be used, and the font size, aspect ratio and colour may be specified either as an effect or as a style. This is, in itself, unusual in a CAD package and very welcome, as it allows the use of mathematical symbols and Dingbats to annotate the drawing.

The final two icons on the right of the toolbar are only available when an object is selected, and allow you to reflect or copy an object or objects about a point or line. Multiple copies are possible, and this facility can be used in conjunction with variables, allowing the numbers of copies to be specified. Existing native files may be imported, letting you build up a library of common objects. Draw files may also be imported and attached to construction lines, enabling the import of complicated shaded objects to enhance a drawing.

A separate application called SnapHappy is provided, which is similar to Paint's snapshot facility; however, it creates an Ace film which can be replayed with the public domain utility, Projector. Animation is made even simpler because any variable may be increased by one unit by pressing F10 and then Return. SnapHappy recognises this and adds another frame to the film automatically.

Files may be exported in DXF format, suitable for importing into more traditional CAD packages, as well as Draw files and text files. The manual is concise, with an explanation of most of the commands along with a tutorial section and three assignments to follow; unfortunately, not everything is explained as well as it could be, and it is very easy to miss some of the finer points of the package.

Summing up

Overall, Apollonius worked very well; it did occasionally produce errors, although I never lost any work because of them. As I mentioned earlier, hatching is not yet implemented, as it is proving very difficult to get the high level of accuracy required, although Oak Solutions hope to have it working by the time you read this.

I would suggest that this product is most suitable for simple engineering or model-making, as the 'what if' benefits of relational drawing would suit this purpose very well. Whilst it would doubtless be useful for other purposes, purchasers may well find it more valuable in combination with a more traditional package.

One major omission from my point of view is a scale drawing facility. Oak suggested that I could try drawing at full scale, as the paper size is configurable up to one kilometre! Unfortunately, though, the scale view is not up to displaying this size as the smallest reduction is 6%. Nevertheless, Oak Solutions seem very committed to developing this product fully, and it has a great potential given its intuitive interface. I would recommend this product, with some reservations, and suggest you try before you buy. *uR*

Product: Apollonius PDT

Supplier	Oak Solutions Dial House 12 Chapel Street Halton Leeds LS15 7RN Tel. 0113 232 6992 Fax 0113 232 6993
Price	£176.25 inc. VAT & p&p

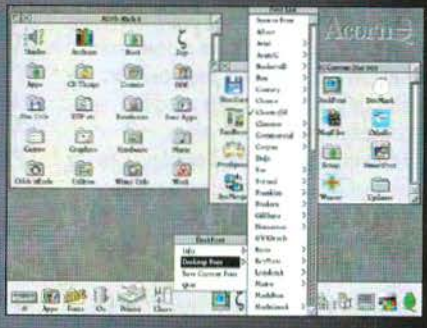
Points Arising

In the October issue of RISC User (8:10) we printed the wrong Email address for Ben Summers on page 11. The correct address is 'ben@xara.co.uk'.

RISC user

Packed with useful applications, the disc costs just £4.75 inc.VAT.
Please add £1 p&p.

DeskFont *by Tony Howat*



DeskFont accompanies the article on page 20 about using the Toolbox, but is also a useful program in its own right. It allows you to set the desktop font on a Risc PC without having to go through the laborious process of running Configure. Just fire up DeskFont and choose the font you want from the icon bar menu. You can revert to Homerton.Medium at any time just by clicking Adjust on the icon, and you can save a file that enables your choice of font to be used automatically on start-up.

DevMark *by Tony Howat*

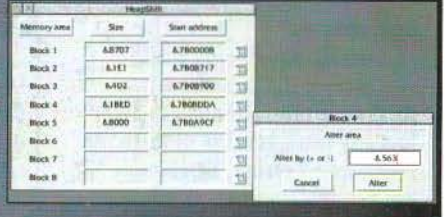
DevMark allows you to find the file-transfer rate of any RISC OS filing system. The program will measure both the read rate and the write rate separately. Multiple tests may be carried out and the results saved for future reference.

B-Format *by Graham Crow*

B-Format is a program formatter which improves the legibility of Basic listings by indenting lines and structures, splitting multi-statement lines, inserting extra spaces where necessary, opening up lines between function and procedure calls, and converting SWI numbers into names. It is ideal both for tidying up your own programs and for making compressed Basic listings readable.

Heap Shift

by Alan Wrigley



A demonstration program which makes use of the memory management routines in *Wimp Topics* on page 17.

FastKeys

by Gary Lee

This flexible utility allows you to create keyboard hot-key definitions which make using the desktop much more efficient. A particular benefit of *FastKeys* is that it can perform actions with specific menus, thus allowing you to create keyboard short-cuts for applications which do not already have them. Execution of hot-keys can depend on the position of the pointer, and possible actions include making multiple-level menu selections and clicking icons. If you need any extra commands which are not provided by FastKeys, you can extend the program's functionality simply by adding your own Basic procedures.

Save Check

by Matt Browne

Save Check is a utility that checks to see if all the documents on your desktop have been saved. With Save Check installed, pressing *<Ctrl-Shift-F11>* on the keyboard will prompt every application on your desktop to alert you about any unsaved documents and let you save them.

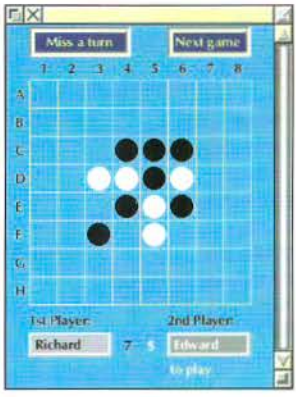
Update

A new !RunImage file which fixes a small bug in the September issue's *PlateRead* application.

MAGAZINE DISC November 1995

Reversi

by Gillian Bobbett



Reversi is a two-player multitasking version of the classic board game which is also known as *Othello*.

Puzzle

A Draw file containing the monthly puzzle for you to fill in on-screen.

ArcScan Data

The *ArcScan* index for this month's RISC User.

Toolbox Modules

© *Acorn Computers Ltd*

The appropriate modules from Acorn's new Toolbox to allow you to run the *DeskFont* program.

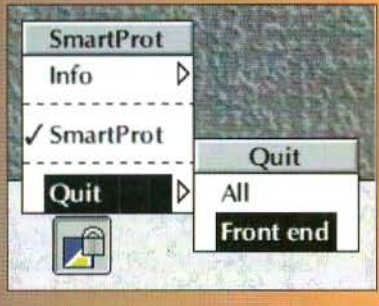
Print Speed

by Matt Browne

Print Speed is a utility which greatly speeds up the time it takes for you to regain control of the computer when printing, especially on PostScript printers. When Print Speed is loaded and you print from any application, the output is sent through *Scrap* and queued for later printing. Assuming you have the 'Background printing' option turned on in *Printers*, printing will then be queued sensibly and happen in the background, letting you get on with whatever else you want to do.

Smart Protect

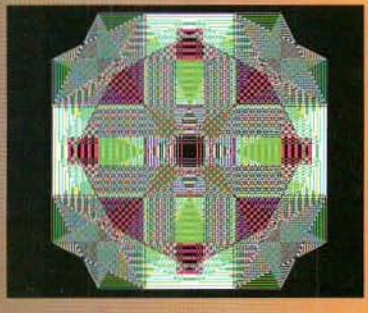
by Matt Browne



When a file is deleted from a disc, only its reference in the disc catalogue is normally removed; the data itself remains on the disc, and can be retrieved using a disc editor. *Smart Protect* gives you the extra security of knowing that confidential data has really been deleted and cannot be retrieved by such means! With Smart Protect active, deleting a file will first overwrite it with blank spaces before performing a 'normal' delete, thus ensuring that the data really is irretrievable.

Weaver

by R. A. Swetman

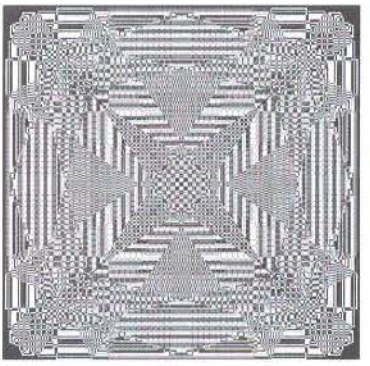


This month's *Just a Page* program creates random multi-coloured symmetrical patterns similar to weaving.

Just a Page

Ever fancied weaving your own designs? This little program from R.A. Swetman will help you create some eye-catching patterns.

Weaver is a short Basic program that creates random multi-coloured symmetrical patterns. You could use it to give you inspiration for your own designs, or just to sit and watch the patterns unfold when you want a break from your work.



Type in the listing carefully and save it as *Weaver*. When you run the program, the screen will clear and the first pattern will be displayed. New patterns will appear every couple of seconds - you can alter this time delay by changing line 430 to the number of centiseconds required. The patterns will be built up quickly at first, but if you press the T key you can toggle the speed of the process between fast and slow.

Pressing the space bar at any point will freeze the display, and while it is frozen you can save the current design as a sprite by pressing S. Press Space again to unfreeze the program. Sprites will be saved in the currently selected directory as *Weave1*, *Weave2* and so on. If you want to specify a pathname for the saved images just alter line 520.

Happy weaving!

Listing 1

```
   10 REM            >Weaver
   20 REM Author     R.A.Swetman
   30 REM Version    1.00
   40 REM RISC User  November 1995
   50 REM Program    Subject to copyright
   60 REM            Not Public Domain
   70 :
   80 MODE13:OFF:ORIGIN 640,512
   90 Z=RND(-TIME):C%=1:SLOW%=FALSE
  100 MOUSE OFF:ON ERROR PRINT REPORT$+"
 at line "+STR$ERL:END
  110 :
  120 REPEAT
  130  SYS 6,21,0
  140  IF RND(2)=1 THEN
  150   COLOUR 128 TINT 0
  160   VDU19,1,24,0,0,0
  170  ELSE
  180   COLOUR 255 TINT 192
  190   VDU19,1,24,255,255,255
  200  ENDIF
  210  CLS:L%=2+RND(2):A%=RND(63)
  220  B%=64*(RND(4)-1)
  230  GCOL L%,A% TINT B%
  240  X%=4*RND(120):Y%=4*RND(120)
  250  dx%=4*RND(4):dy%=4*RND(4)
  260  Q%=80+RND(150)
  270 :
  280  J%=0
  290  REPEAT
  300   J%+=1
  310   RECTANGLE -X%,-Y%,2*X%,2*Y%
  320   RECTANGLE -Y%,-X%,2*Y%,2*X%
  330   X%=X%+dx%:Y%=Y%+dy%
  340   IF X%>480 dx%=-4*RND(4):GCOL 2+R
ND(2),RND(63) TINT 64*(RND(4)-1)
  350   IF X%<-480 dx%=4*RND(4):GCOL 2+R
ND(2),RND(63) TINT 64*(RND(4)-1)
  360   IF Y%>480 dy%=-4*RND(4):GCOL 2+R
ND(2),RND(63) TINT 64*(RND(4)-1)
  370   IF Y%<-480 dy%=4*RND(4):GCOL 2+R
ND(2),RND(63) TINT 64*(RND(4)-1)
  380   IF INKEY(-36) SLOW%=NOT SLOW%:RE
PEAT UNTIL NOT INKEY(-36)
  390   IF SLOW%=TRUE Z=INKEY(5)
  400   IF INKEY(-99) PROCPAUSE
  410  UNTIL (J%>Q% AND ABSX%?20)
  420 :
  430  Z=INKEY(200)
  440  IF INKEY(-99) PROCPAUSE
  450 UNTIL FALSE
  460 END
  470 :
  480 DEF PROCPAUSE
  490 REPEAT UNTIL NOT INKEY(-99)
  500 REPEAT
  510  IF INKEY(-82) THEN
  520   OSCLI "ScreenSave Weave"+STR$C%
  530   C%+=1
  540  ENDIF
  550 UNTIL INKEY(-99)
  560 REPEAT UNTIL NOT INKEY(-99)
  570 ENDPROC
```

Working with Photodesk

Lee Calcraft experiments with Spacetech's multi-faceted art package

As we said in our original review way back in Risc User 7:8, Photodesk is a sophisticated and well specified painting and photo retouching package. One of its many strengths is the almost miraculous way in which you can combine virtually any tool with any effect to produce an almost infinite variety of combinations. This means that there are sometimes many different ways of achieving a particular result, and you may not always hit on the best one first. In this short article I want to explore the use of a selection of tools, and the way in which they can be combined.

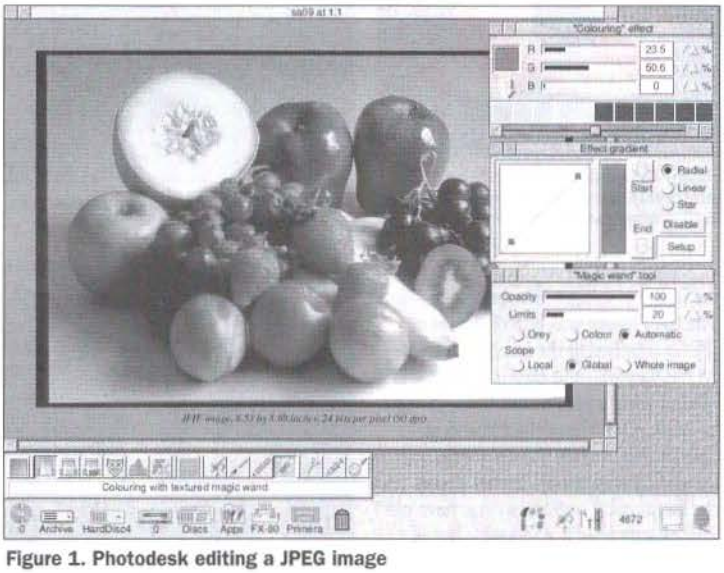


Figure 1. Photodesk editing a JPEG image

Shaded Text

I will start with some very simple tasks, and what could be simpler than putting up some shaded text. First set up the font and type size, delete the word 'PHOTODESK' which annoyingly appears in the text window after every cold start, and type in the lower case 'a'. By the way, all the text examples here use a lower case 'a' in the Eric font at 300 pt bold (real name - Gill Sans) - and don't worry about the redraw bug that affects the display of large letters in the text writable icon.

Obviously we must write the shadow before we write the foreground text. You can either select an appropriate shadow colour from the main palette, or you could try a little subterfuge, and use the syringe tool to sample your current background colour, and then on the *Colouring effect* window (brought up by the left-hand paint pot), just reduce the red, green and blue components by say 30% to arrive at a more realistic colour for the shading.

After painting the shadow, select a foreground colour for the text, and lay this down a few millimetres above and to the left of where you put the shadow (see figure 2).

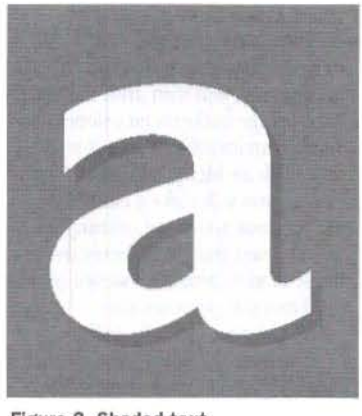


Figure 2. Shaded text

If your background is not plain you might like to try a more subtle approach to shadowing. This involves writing the shaded bit using a filter which simply reduces the brightness of the image in the shaded areas. To do this, click on the middle paint pot *Toning effects*, select *Tint/shade*, and move the slider to reduce the tint by about 40%, then write your shadow. See figure 3 for the result of the shading exercise. When the foreground letter is put in place the effect works well, giving a hint of metallic 3D to the letter (figure 4).

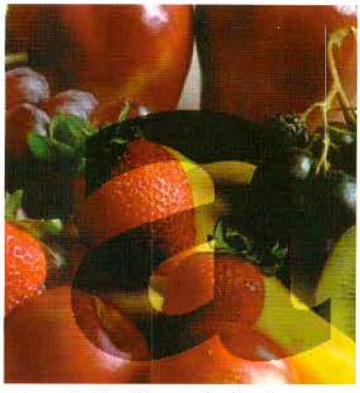


Figure 3. Creating a shadow by darkening the tone

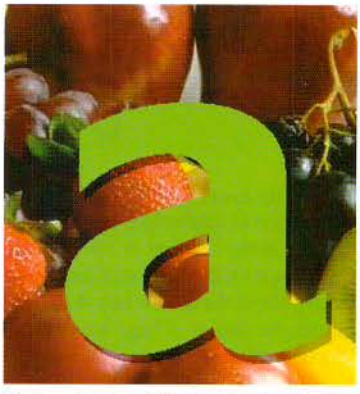


Figure 4. Completed text using tonal shading

Using Masks

So far we have been concentrating our efforts on the shadow, it's now time to work on the foreground letter. We can achieve many worthwhile effects by using Photodesk's powerful mask facility, which enables you to create a mask from almost any previous activity. In this case, I took a new window, gave it a purple background, and then drew the letter 'a' using the background colours. The result is an invisible 'a', but if you now click on Menu, and select *Mask*, *Create*, you will make a mask out of the previous activity of painting the 'a'. The next thing is to *Invert* the mask so as to produce a stencil of the 'a'. From this point on, the possibilities are virtually endless.

The image in figure 5 was created by airbrushing in white through the mask, and then applying a series of parallelograms in red with the drawing tool. The mask was then inverted, and the magic wand was used to apply a global fill to the background using the graduated effect gradient (the toolbox icon at the far left) set linearly between blue and purple.

Alternatively, you could apply the gradient to the colouring of the text itself (see figure 6).

But of course you could also put any image through the text mask. Just load an image into a new Photodesk window, cut out a large lump of it, and then simply copy it through the mask. This will give text derived from the image.

Figure 5. Using a letter mask to customise both foreground and background colouration

I have used this technique to write the letter 'a' in tiger skin (see figure 7). The tiger image was one of the set of JPEGs supplied in the Images directory on the Risc PC, and the *Copy* tool was used to copy a part of this through the 'a' mask. Unfortunately, Photodesk does not let you see the content of an image as you paste it - it only shows the rectangular outline, so you have no idea exactly how it will look - but of course, you can always perform an *Undo* and try again if it is not right.

Photodesk has two modes of working as far as the undo is concerned. Essentially there is only one undo stage, though you can include in that as much or as little as you like. Of the two modes of operation, you can either choose for undos to take you back to the point where you last changed tools, or where you last manually froze the image by pressing the space bar. The problem with the former is that you can never undo further back than the last tool change. I prefer to keep things under my own control, where you press the space bar whenever you want to fix the image. Any undo will then take you back to that point, and no further. The only snag with this is that you must remember to fix the image at appropriate points along the way. For example, once you are happy with a text shadow, you must remember to hit the space bar, or else if you use *Undo* when you are drawing the foreground, you will have to recreate the shadow as well.

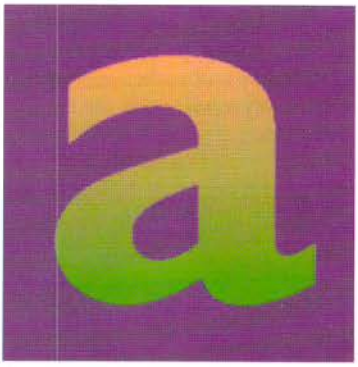


Figure 6. Using the inverted mask to paint in blended colours

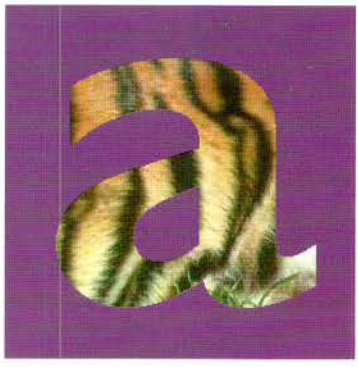


Figure 7. Tiger skin text, courtesy of copying through a mask

Alternative routes

Because of the clever way in which Photodesk lets you combine all manner of tools and effects, there are usually at least two ways to achieve any particular

effect that you are aiming at. In the case of tiger skin writing, there are at least three, and we have only looked at the hardest. The most cunning is to use text as a tool to cut out an area to copy. To do this, make sure that *Text* is selected, and that the letters or words that you want to write are typed into the writable text icon, then simply click on the *Copy* icon. The tool descriptor will read *Using the drawing tools to define the region to copy*, and as you move the mouse around, you will see the text cutting tool moving with it. Just click to perform the cut, and then move to the area that you want to write onto, and press Select. Unfortunately, you get no idea of the position of the object to be pasted in relation to the pointer from which the pasting is controlled - but you can always hit *Undo*, and try again.

Cloning to the fore

The big snag with all of the copy options in Photodesk is that as soon as the copy has been performed, the original cut-out is lost, and you are put back into cutting out mode. This makes it very difficult to do things like build a crowd from a single person, or make a bowl of fruit given just one apple, but this is where the cloning tool comes in handy. It is hidden away under the *FX* icon, and is bundled with things such as *Ripple*, *Motion blur* and the like, and it has taken me a long time to realise that this is the way to do multiple copies. In fact even phone calls to Spacetech could not uncover a way to do multiple copying. However, because Photodesk is so incredibly versatile, we will forgive them!

The cloning tool is particularly clever, and well worth experimenting with. Basically, when you click on the *Sample* button in the Cloning tool window (see figure 8), it lets you specify the central point from which cloning will occur. After that you can start the cloning process using any tool that you like. The airbrush is a good one to use here, so you move the airbrush over the destination canvas (which can be in the same window as the source if you like), and the point at which you start airbrushing applies the part of the image that you sampled from. As you move the airbrush around, a crosswire on the source image moves correspondingly, showing you which part of the source is being airbrushed onto the destination canvas. Get it?

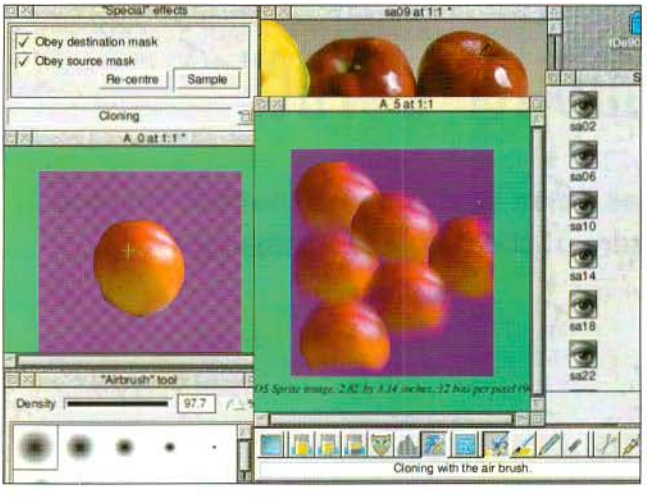


Figure 8. Multiple copying with the clone tool

Well, it works perfectly, and you can even apply other tools at the same time, such as the blend tool. This means that you can make the applied image fade away either linearly or radially to your own prescriptions. But the really excellent thing is that you can see from the cross wires on the source image *exactly* what part of the source image you are applying - and of course you can specify the exact strength with which the effect will be applied, and you can make use of masks on both the source and destination images.

Figure 9. How do they do that? Next month we reveal (almost) all

Multiple Cloning

This allows us to devise a means of very precisely controlling the multiple cloning of a single object. Here is how to do it. First of all, choose your object, and cut it out with an ordinary cutting operation using the lasso. I opted for an apple from the Risc PC's Fruit bowl JPEG (image sa09). Next, paste this onto a spare window somewhere, and from that window make a mask from the previous action (i.e. the pasting), and then invert it, so as to mask out the unwanted background. This is going to be the source image for the cloning operation.

Next choose *Cloning*, and sample from the middle of the object - the centre of the masked apple in this case. Now you can use the airbrush to clone the apple onto your destination window, and because the source is masked, you will not copy any of the unwanted background across. To airbrush a second apple onto your picture, click on *Sample* again, and then on the middle of the source apple, and then clone the apple into your picture again. You can then repeat this simple process until you have an orchard full.

Finally, you may have noticed figure 9. This effect was created with extensive use of masking, and you may like to have a crack at producing something similar. Next month we will reveal how it was done. Until then, happy cloning.

Compiler Corner

Thomas Down begins a new monthly feature for users of the C and C++ languages

Wrapping up errors

Those of us who started programming using Basic will be used to that language's error-trapping routines, which mean that most operating system SWIs can be used without giving too much thought to what would happen if one of the calls were to fail for any reason: the error would be trapped by the SYS function and your ON ERROR code would be called. It is easy to forget that C does not catch errors in this way; run-time error handling is extremely simple, and those errors that do get caught are serious types which should never be produced by a bug-free program.

What C programs often ignore are the errors that are occasionally returned by SWI calls: errors such as 'File not found', which could occur even if your code is perfect. Whatever function library you use, when you make operating system calls, it is likely that you will be using functions which return a pointer to a structure called an *os_error* (or, when using Acorn's toolbox libraries, *_kernel_oserror*; the two differ only in name). While it is not illegal, ignoring this pointer is likely to mean that any error which occurs will be ignored: the program will simply continue execution, quite possibly producing meaningless results.

The simplest way to deal with these pointers is to wrap up all calls to error-returning functions using a simple procedure which checks to see if an error has occurred and reports it if necessary, and the quits the program. Using the WimpLib library supplied with Acorn C/C++, the following function will do the job:

```
#include <stdlib.h>
#include <wimp.h>
#include "wimplib.h"
void check_error(_kernel_oserror *e)
{
 if(e) {
   wimp_report_error(e, \
     Wimp_ReportError_OK,\
     "My Task's Name");
    exit(1);
   }
 }
```

Similar functions are supplied with RISC_OSLib and DeskLib, known as *wimpt_noerr* and *error_CheckFatal* respectively. Such functions can be used as follows:

```
check_error(wimp_create_window(&my
window,&myhandle));
```

In this case, if the Wimp is unable to create the window for any reason, the error message will be displayed in a standard error box, and the application will quit. For simple applications, this is the easiest and most reliable approach to take since, if anything goes wrong, no attempt is made to continue execution. In the above example, if execution were to continue, any subsequent attempt to open the window would fail, since *myhandle* would not contain a valid window handle. But if you are writing a major editor, it may be best to take a more sophisticated approach; it is very frustrating for users to lose work.

The first stage in improving error trapping is to consider, for each call which is likely to produce an error, whether it is really necessary to quit. Consider, for example, a call to OS_File in a save routine. This is quite likely to produce an error: Disc Full, or Protected Disc, would be typical. In this case, it should be quite easy to modify the routine such that if a non-zero error pointer is returned from an OS_File call, the operation is aborted without quitting the application or losing any data.

This approach will work in many circumstances, but when there is no simple way to deal with an error, it may still be possible to avoid data loss. To do this, modify your *check_error* function to create a new subdirectory within the current "Wimp$ScrapDir", then save each currently-loaded file inside this directory. You can then display a message (in an error box) telling the user where to find his files. This technique is used by the RISC OS 3 versions of Paint.

You should, however, exercise care when using this method. If an error occurs during an operation which modifies the file in memory, the file may temporarily fail to comply with the relevant format, and attempting to save it will result in a corrupt file being stored. To avoid such problems, before performing any editing operation which leaves an invalid file in memory, you should set a flag which prevents automatic saving. This can be unset as soon as the file in memory becomes valid again.

C Libraries in C++

When you link C++ code with libraries designed for use with C, you may find unexpected error messages. These can usually be avoided by declaring the relevant header files as following the "C" linkage conventions, e.g.

```
extern "C" {
  #include "myheader.h"
}
```

Some libraries, such as recent versions of DeskLib, detect when they are being included under C++, and make this declaration for you automatically. This approach should get most libraries working, but there could still be problems if your library uses C++ reserved words: you are unlikely to be able to use RISC_OSLib due to its use of the name template.

What's in a Gname?

C and, particularly, C++ compilers have always tended to be relatively expensive pieces of software, and this can discourage some beginners from learning these languages. But now, owners of any RISC OS computer with a hard disc and a reasonable amount of memory can try out the languages for free. The GNU C compiler (GCC) owes its origins to UNIX systems, but it has now been ported by Simon Callan to run under RISC OS. It is distributed under the GNU general public licence, and can thus be obtained freely or for a nominal charge from PD libraries and other sources.

As well as compiling C, the package also includes C++ support. Like Acorn C/C++, the version I tested supports templates, but complains if you try to compile code which uses exceptions. These could be included in later versions.

The system will not, however, suit everyone. You will have to install the package on a hard disc, and the compiler requires at least 3Mb of free memory to run. Matters are helped by a virtual memory manager, which is supplied with the package, but owners of 2Mb Risc PCs or A7000s should note that this does not work with the new memory controller. There should be no problem on a 5Mb Risc PC though.

The compiler itself is not really designed with the beginner in mind. It can only be run from the command line, and throwback of errors does not appear to be supported. Nevertheless, for many users these will only be minor drawbacks, making the package well worth investigation. I hope to give this compiler further coverage in later columns.

Loading toolbox modules

When running a toolbox application under any version of RISC OS earlier than 3.60, it is vital that all the required toolbox modules are loaded first. If such a program is run with one or more toolbox modules missing, behaviour can be unpredictable, particularly if you have taken short-cuts with error trapping (see above). If you are having any sort of problem with one of your toolbox programs, it is worth checking that all the necessary modules are loaded before looking for an error in your code.

If you want to test a toolbox application quickly, without producing a full !Run file to RMEnsure the relevant modules, simply drop the program's resource file onto the *ResTest* icon. This will automatically load the required parts of the toolbox. You can now test your !RunImage without worrying about missing modules.

Hierarchical projects

When writing a large program, it is considered by some to be good practice to split the source into as many files as possible; indeed, some people believe that the ideal source module contains only one function. However, current RISC OS filing systems impose a limit of 77 files per directory, which can prove restrictive when splitting up large programs. Also, the limit of ten characters per filename does not help the allocation of meaningful names. For these reasons, when writing major applications, it can be a good idea to split the source into several directories, each containing its own *c*, *h* and *o* directories.

Such a hierarchical structure allows related code modules to be grouped together, and allows the final application to be built from an almost unlimited number of source modules. A minor problem occurs when it is necessary to include a header file stored in another directory, but this can be avoided either by using the '^' operator, i.e.

```
#include "^.Windows.h.SaveAs"
```

or by setting up a suitable path system variable:

```
#include "MyProject:Windows.h.InfoBox"
```

If you have a group of header files which are commonly used by source modules from several directories, you may wish to store them together in a *Global* directory.

The only major problem with this system occurs when creating a makefile. Acorn's *Make* allows source modules to be taken from several directories, but will try to store all the compiled object modules together in a single *o* directory, so the 77-file limit returns. Currently, the only way round this problem is to write makefiles by hand, and execute them using the *amu* tool. Although this can be a little tedious, if it improves source code organisation, it is likely to be worthwhile in the long term.

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the Art of PHOTODESK

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"Photodesk provides an almost limitless number of facilities, a large proportion of which would never be used entirely for photo retouching but contribute to making Photodesk a phenomenally flexible and versatile application for creative art as well." Acorn User.

Peacock

copyright David Cowell 199

First

Colin Singleton examines a powerful package for statisticians

Fully Interactive Regression STatistics from Serious Statistical Software has evolved over a number of years to meet the requirements of any mathematician, from the student to the most demanding statistician. The original single-tasking version of the software has sprouted numerous extra features, many by request from users, and has undergone a subtle change of name to become *1st*. However, its development into a multitasking application has not been entirely in line with RISC OS conventions, which has led to some unusual and confusing aspects, of which more later.

An entry-level version, *1stL*, contains a carefully selected subset of the features of 1st, designed to avoid overwhelming the novice user. An intermediate-level version, *1stJr*, is targeted at secondary schools, and this is apparently the most popular entry-level version. The suppliers offer a 'try before you buy' option, based on trust: the software they supply is not disabled in any way. For a modest fee they will build a bespoke package containing just the modules the user requires.

First impressions

The package, whichever version it is, comes on two floppies, the first containing the software with a selection of data files for your first experiments, and sample results: 'printed' reports as text files and graphs as Draw files. The disc also contains a demonstration to whet your appetite: a sort of auto-changing slide-show of very impressive full-screen displays. First, though, you should copy the on-line manual from the second floppy onto your hard disc and start it running. While you are using 1st, this will provide a help display, changing automatically as you use various features. Unfortunately, it tends to monopolise the screen, and you can only browse through the current section of the on-screen manual; to investigate another section you need to know its page number. It is rather like trying to use Teletext without the structured indexes. This is rather a shame; the printed manual which accompanies the package explains the basics, but a wealth of information is hidden in the on-line manual.

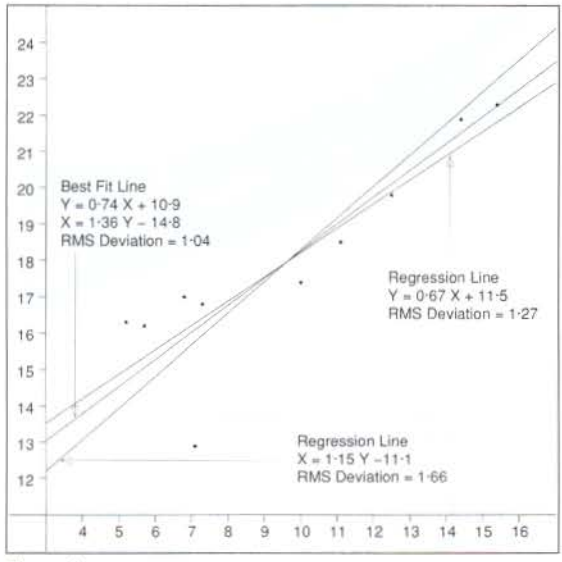

Figure 1

Data entry and manipulation

First, define the size of matrix you require: this is where all the data and results of an analysis will be held. The default is 20 columns by 200 rows but, with the full version of 1st, the potential is limited only by available memory. Columns are headed with variable names and contain lists of values of the variables for processing. Values may be entered manually, imported from CSV files (or an existing 1st file) or calculated from data already in the matrix. One annoying little feature is that when a cell is selected for amendment, its current contents are hidden from view. Indeed, there is usually one such hidden cell even when you are not amending data. The 'generate variable' facility allows the values of a variable in one column to be calculated from those in other columns. The necessary equation is entered in Basic, and is very easy to apply. Beware, though, that if you amend a value, any others calculated from it are not automatically recalculated. It appears to be necessary to delete

the complete dependent variable column and re-define it, including re-entering the formula, which is very unfriendly! Row numbers can be stored as values of a variable. Other options generate random numbers, or the lists of Binomial or Poisson Distribution values for given parameters. These can be stored in the matrix for Regression Analysis against entered data.

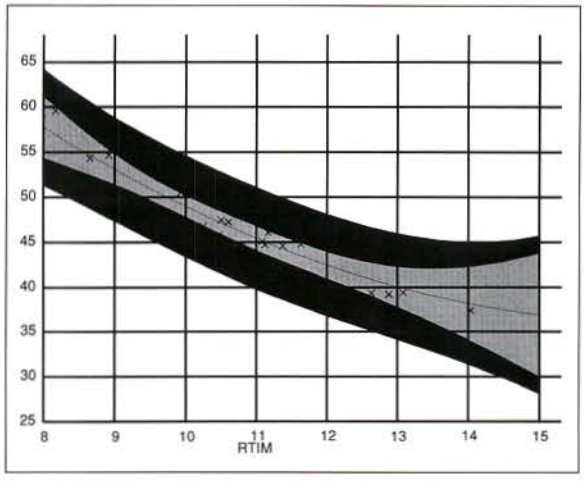

Figure 2. Predicted OXY with estimated 95%C.I's for regression line and single points.

Statistical analysis

The multitudinous options provided are grouped under three headings: Uni- and Multi-variate Stats, Regression, and Analysis of Variance. The Stats module calculates the basic parameters of a set of values (mean, standard deviation, skewness, etc.) and correlations between two or more variables. The standard confidence tests, including *Student's-t* and *Chi-squared*, are available, plus a facility to assess the 'normality' of a distribution. Analysis of Variance analyses the effects of a number of 'treatments', each applied to each of a number of 'subjects', or possibly more than one group of subjects. To confuse the user a little, 1st requires him to enter his table of data into a single column of the matrix. This feature is mainly for the specialists; neither the demonstration nor the sample data files include analysis of variance, so the user cannot learn the feature by example.

Many of the available options are outside mainstream analysis: some are techniques for handling freak values (the manual calls them 'outliers') so that they do not have too much or too little influence on a regression analysis. Others apply numerical analyses to non-numeric data. Impossible? Not quite! Consider a contest in which each judge places the candidates in order of merit. The place numbers (first, second...) are not numerical assessments of quality, but they do permit comparative analyses of the various judges' lists. In other applications, individuals are classified, according to almost any criteria, into Class-1, Class-2, etc. with several individuals in each class. Class lists for various criteria can be analysed using suitable techniques; there are no 'right' or 'wrong' ways of performing these analyses.

Regression

The selection of Regression Analyses is very impressive, and is the kernel of the package. The number of independent variables is almost unlimited, and regression may be linear or non-linear. The latter may be accomplished either by specifying an equation in Basic (including parameters to be calculated by progressive approximation), or by first generating extra variables whose values are the squares, cubes, etc. of the values of the original variable. The second is perhaps preferable, since the software can calculate the parameters directly by linear regression analysis using the calculated variables. Linear analysis is instantaneous for modest data volumes, whilst non-linear analysis takes from a few seconds to a couple of minutes.

The principle of Non–linear Regression Analysis is similar but, instead of fitting to a line, we fit to a curve of a given form (model) with parameters (coefficients)

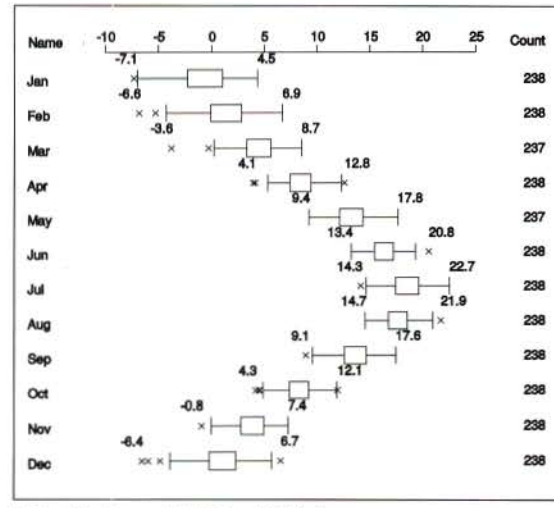

Figure 3. Box and Whisker Plot(s)

whose optimum values are to be calculated. Fitting to a parameterised equation can be easy (for the software, that is) or it can be difficult: that is in the nature of the problem. 1st could, perhaps, be more user-friendly in its approach; if I opt to use one of the built-in models, it asks me to enter starting values for the parameters, from which it will, hopefully, derive optimum values by progressive approximation. Unfortunately it does not display the model equation until after I have entered the parameters, so I have no way of knowing what these parameters are! To add insult to injury, it then asks me to confirm that my entries are correct without displaying them. The process is, therefore, very hit-and-miss, unless I have already completed a similar analysis. If my values are unsuitable, the analysis will halt, either with a programmed error message, or with a set of silly parameters.

Plotting

The plotting facilities are excellent! Variables in the data matrix, whether entered, imported or calculated, can be plotted as graphs, scatter charts, histograms or box & whisker charts. The results of regression analyses are very effectively displayed. All plots appear on the screen and can be saved as Draw files for printing. Figures 2 and 3 are taken from the demonstration package which accompanies the software. Figure 2 shows a non-linear regression curve fitted to a set of points. The shading indicates the 95% confidence 'fiducial belts' for the curve and for individual points. In the Box and Whisker chart (figure 3), each symbol shows a box (containing 50% of a set of observations) and whiskers (approx. 95%) plus individual observations outside that range.

I have used the regression and plotting features to demonstrate what I had long suspected: wages in the UK form a pattern in which the logarithms of weekly (or hourly) pay form a normal distribution with a very high degree of confidence. Readers following the current debates on pay rates may be interested to know that those at the top end are significantly higher than they should be according to the log-normal distribution; but so are those at the bottom end! I have tried to find a suitable model for the growth of world population,

continued over page

If YOU are thinking seriously about
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1st and 1st Jr have enhanced specifications.
RISC OS 2 and 3 compliant. Structured Menu System. "Spreadsheet" data entry. Simple access to UNMATCHED STATISTICAL FACILITIES. Drawfile output of Graphics. Ultra-easy import and export of CSV files giving smooth data interfaces to other software. Automatic, context sensitive Manual. Mouse driven with optional keyboard shortcuts.
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but have not found anything nearly as good as the differential equation which I had previously found by experiment. 1st won't handle differential equations!

Problems

Some writable icons, rather confusingly, have to be selected using the Menu mouse button instead of the conventional Select button. The worst problem, though, is the way menus are handled: they disappear as the lower-level menus appear, and to select a new option it is usually necessary to restart by clicking on the icon bar icon (not the data window). This can become annoying if you wish to repeat a non-linear regression analysis with different parameters, for example, and it is a very long-winded process to go round again. Some of my attempts at non–linear regression produced an inexplicable "Missing variable" error, but they worked given different starting values for the parameters. I did once get stuck in a rut when 1st stubbornly refused to delete certain variables from the matrix. Finally, the package is awkward to use for experimental curve-fitting; but perhaps it wasn't designed for that purpose. I am very pleased to report that the software never crashed.

Conclusion

Serious Statistical Software claims, a little immodestly, that no–one else is in the same league, but their self-esteem is surely justified. For schools, universities and research institutions, or anywhere where statistical techniques are either taught or applied, this package is a valuable asset to an Acorn machine. It is not cheap, but you do get value of money; and you can try it first. I may need a course in advanced statistics to discover the full potential of this package; but, for those who need even some of the facilities and who can put up with the deviation from RISC OS standards, I can recommend it highly.

PRODUCT: First

Supplier	*Serious Statistical Software*
	Lynwood
	Benty Heath Lane
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	South Wirral L64 1SD
	Tel. 0151 327 4269
Prices	*1st: £205.00*
	1stL: £70.00
	1stJr: £105.00

CineWorks update

Alan Highet revises his opinion of Oregan's video editor program

When I reviewed CineWorks in RISC User 8:9, I found a number of shortcomings in the software, not least a serious degradation of image quality between the imported file and the edited film. Since writing my earlier review, however, I have received the latest version of the software, and am pleased to report that it has corrected all the bugs which I found in the earlier release.

Most importantly, there is now no discernible loss in quality when the edited film is resaved. Exporting has been improved, with the software catering for both 8-bit and 24-bit AVI files, as well as MPEG. The latter is no mean feat in itself, given the high cost of hardware normally associated with MPEG coding.

Oregan also tells me that full-screen replay to a video recorder is now possible for the cost of only £10 for a connector cable. In fact, this is not quite as good as it first sounds, as it relies on you having a PAL TV coder and a video recorder that can record single frames, but it is a start.

Importing files is still problematical, but with the addition of MovieFS software from Warm Silence Software (reviewed in RISC User 8:7), the problem disappears.

The only thing still left to overcome is a compatibility issue with the 16-bit sound card, but Oregan and Acorn are aware of the problem, and a solution should soon appear.

In conclusion, I can now recommend this product, and I think we can look forward to some further exciting developments.

CineWorks

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Netline

Robin Watts continues his examination of Net matters with a look at how computers talk to one another

Last month, I dedicated the column to talking about the World Wide Web and the way it works. During the course of the article, I referred in passing to the idea of protocols and ports. This month, I want to expand on this, and explain exactly how computers on the Internet communicate, and some of the problems that can arise.

Packets, ports, and... elves?

Exactly how two computers on the Internet talk to each other is not important; regardless of whether they are connected by a fast fibre-optic link or by a humble 300 baud modem, the basic principle of their communications will be the same. Imagine that somewhere buried inside your computer is a row of numbered pigeonholes, which we will call *ports*. (These are not actually physical interfaces; just low-level numbers which the software uses internally.) On one side of these pigeonholes is your computer, and on the other side is a little elf with one of those pneumatic tubes you see in department stores.

Two computers on the Internet can communicate by sending messages via the elf. If my computer wants to send a message to another computer, it will put the message, together with a port number and the address of the computer it wants to send it to, into one of the pigeonholes.

The elf then picks up the message, wraps it up in a parcel (or packet), writes the destination address on it, and drops it into the pneumatic tube. As it travels down the tube, it will come to various crossroads where more elves will move the packet from tube to tube according to the address on it, until finally it arrives at its destination.

Each of these elves is fairly smart, and so will try to send the packets the fastest way it can, to avoid breakages in the tubes, or even parts of the network which are overworked. Each packet can be sent by a completely different route, but as long as it reaches its destination, we don't mind.

The elf at the destination will then unwrap the packet and put the message into whichever port number was given with the address. If the remote computer is listening at that port, it will read the message and the elf will send an acknowledgement to say it arrived safely; if not, the elf will send back a refusal.

Now, the elves are far from perfect, and packets can sometimes get lost on the way to their destinations, whether by falling out of the tubes, or by being incorrectly redirected along their journey. To cope with this, the first elf takes a photocopy of each message before it is sent, and if it is not acknowledged within a certain time, the elf will try sending it again.

All communications on the Internet are built up on top of this. A good example is the *Telnet* program. When you use Telnet to connect to another computer, you give the computer's name and, optionally, a port number (if you don't give an explicit port number, it assumes you want port 23). Telnet picks an unused port on your computer, and forwards anything you type through it to the specified port on the remote computer. Anything the remote computer sends back is displayed on your screen.

Now, it so happens that a lot of computers, especially ones running Unix (or a variant), expect people to use them remotely, and so will offer you a login prompt if you Telnet to them. Many people assume (incorrectly) that this is the only possible use for the Telnet program; there are others, as we shall see below.

Protocols

Other network services such as news and mail are merely extensions of this system. For instance, a news server will watch for other computers talking to it through port 119. A news reader will send messages asking for a given set of articles from a given group there, and the server will send the appropriate articles back.

Obviously, for the news server and news reader to be able to understand each other, they have to use a set of standard messages and agree on what these messages mean; this is known as a *protocol*. Common protocols include Simple Mail Transfer Protocol (SMTP), Network News Transfer Protocol (NNTP), HyperText Transfer Protocol (HTTP), and File Transfer Protocol (FTP).

Each of these protocols carries with it a standard port (so if a computer offers a WWW server, for instance, it will most probably

operate on port 80), but they can in theory be run on any port. On some systems, such as Unix, servers can only be run on low-numbered ports if the person setting them up has 'SuperUser' privileges. For this reason, you may well find Web, ftp and telnet sites that use non-standard ports, because users have been forced to run them above the reserved range.

Now, suppose I am setting up my news reader, and it is refusing to work. The fault could either be at my end, in the way I have installed the software, or at the other end, with the server perhaps being broken at the moment. Experienced users can use the telnet program to connect to the remote server; and by typing in messages that conform to the protocol manually, they can put the server through its paces to try it out. In theory, you could read all your news this way, but having a newsreader that fetches the next article when you hit space is a lot simpler than remembering how to speak NNTP.

Packet sniffing

Whilst this system is both reliable and flexible, it does have certain drawbacks. Every packet on the network passes through the hands of many different elves on its way to its destination; each elf is attached to someone else's computer, and can be instructed to keep copies of some or all of the packets that pass by. This is called *packet sniffing*. Commonly, the first thing you do when you connect to a remote computer is to log on. As you type your password on your screen, even though it is not displayed, it is sent as packets across the network. Now, just by examining the packets kept by the elf, a user could discover your password.

Such discoveries are not as rare as you might think; recently some computers in Cambridge University were the target of such an attack: someone hacked into their system and installed a packet sniffer. The first the people using the system knew about it was when they were mailed by a system administrator from Germany, saying that he had spotted some odd packets being broadcast from their machines; the packet sniffer was reporting its findings. Not only did the packet sniffer have to be removed, but the passwords on all the computers that had been accessed from the attacked computers had to be changed too.

Telnetting to a remote computer to order CDs.

Systems have been developed where the communications between computers are encrypted, so anyone sniffing packets will just see what looks like random rubbish, but these systems are not supplied as standard, and hence are as yet very rarely used.

Secure shopping

Passwords are not the only things vulnerable to attack from packet sniffing techniques. One of the promises of the much vaunted *Information Superhighway* is that you will be able to buy goods, products and services, all from your computer. But how do you pay for them? The obvious answer seems to be to use a credit card: simply transmit the card number to the vendor, and they can debit your account. But what if someone is listening in?

Various groups have been trying to find solutions to this. There is the obvious incentive that whoever comes up with the favoured method will do very nicely by charging a fee for every transaction that is performed. One of the front-runners in the race is an American organisation called *First Virtual*. You supply an email address and your credit card number (by phone, or fax), and they issue you with an account identifier.

You then use this identifier in place of your credit card number when performing transactions. After each transaction, First Virtual email you a query, asking if it was really you, or someone else illegally using your identifier.

The idea is that not only would a fraudster have to obtain your identifier, but he would also have to be in a position to intercept all the mail coming to and from you; a much more difficult proposition.

For those interested, more information on First Virtual's operation can be found by browsing:
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That's it for this month; but, as usual, if you have any comments, then please feel free to contact us at Netline@pobox.com.

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*LoadFontCache after a Risc PC VRAM Upgrade

Ian Giblin

If you have a standard font cache which you load at boot-up (e.g. if you use Zap with outline fonts, this will reduce the time taken to display your first editor window), you will find that upgrading VRAM, and possibly DRAM (though I haven't tried this), causes an address exception error when you try to load the cache. If your *LoadFontCache command is part of *!Boot.Choices.Boot.PreDesktop*, then the problem ends up looking far more serious than it really is. The remedy is simply to skip this command and save a new font cache under the upgraded memory arrangement.

Pocket Book Alarms

Henry Morgan

If you use alarms on the Pocket Book, always make sure that after entering an alarm, you leave time for the Pocket Book to update the screen display (especially in Schedule, which can take a second or so if there are many entries). If you don't then the alarm may not sound - I speak from experience!

Uses for XCLI

Alan Wrigley

The XCLI module we published in RISC User 8:4 has a lot of uses. To recap briefly, it enables you to issue star commands without errors being generated, and is therefore very useful in Obey files where you do not necessarily want execution of the file to stop if there is an error. We will publish various uses for the module from time to time, and to start with here's one I use myself. I use FaxPack as an answering machine, but one small problem with it when listening to messages is that once you have started a message playing, there is no way to stop it until it finishes, other than by starting another message. I have put this to good advantage by pinning an Obey file to my backdrop that plays a non-existent message when run, thus interrupting the first one. Normally when you try to play a non-existent file, an error is given, but by using XCLI and prefixing the command with X, the error is suppressed. So all my Obey file needs to do is:

```
X PlayMessage NoFile
```

The filename can of course be anything that doesn't actually exist.

This method could be adopted for any situation where the only way to stop a file executing is to run another of the same type.

Using More Memory for File Copying

Kieran Mayhew

If you've ever wondered, when copying or moving a large file from one place to another, why the Filer copies it in small chunks even when there are several Megabytes of spare RAM available, it's because the FilerAction module, which performs the operation, claims the contents of the Task Manager's *Next* slot as its working memory. This is normally set to 640K or 800K, and so this is the maximum amount of memory used by the copy or move operation. If you want to move large files around, and you have plenty of free memory, it's worth altering the Next slot before you do so (click on the Task Manager icon and drag the *Next* slider to a suitable value).

Note that on versions of RISC OS prior to 3.5, the same consideration applies to disc backups, i.e. the size of the Next slot is claimed. This means that if you are backing up a full 800K floppy and your Next slot is set to the default 640K, you will be prompted to swap discs twice since the operation can't be done in one go. It's well worthwhile changing your default slot to 800K if this becomes a problem - just add the following line to your boot file:

```
WimpSlot -next 800K
```

RISC OS 3.5 no longer behaves in this way - the backup operation reads the disc's size at the start and claims enough memory for the whole disc, provided it is available in the machine of course.

Checking if a System Variable Exists

Alan Wrigley and Lee Calcraft

If you need to check in an Obey file whether a particular system variable has been defined, you can't simply use a line such as:

```
If MyApp$Variable="" Then ...
```

as this will give an "Unknown operand" error if the variable doesn't exist. The official answer is buried in the PRM: if you set a macro to the value of the variable, and then read the macro, this will give the required result. So in the example above you would use something like:

```
SetMacro MyApp$Temp <MyApp$Variable>
IF App$Temp="" Then ...
Unset MyApp$Temp
```

However, there is a shorter way. If you surround your variable with quotes and angle brackets it will have the desired effect:

```
If "<MyApp$Variable>"="" Then ...
```

The Canon BJC-4000 and

The BJC-4000 is a flexible inkjet from the Canon range which offers both black and white and colour capability. It is designed to appeal to users who primarily print in black and white but who also have a colour requirement. Mono printing is extremely fast (about twice as fast as the BJ-200 on average) due to a special high-speed black ink cartridge and printing can be at a resolution up to 720 dpi using interpolation. However, it can also produce high quality 360 dpi colour prints. The inks have been specially developed by Canon for this printer and are fast drying and water resistant.

RISC OS 3 Turbo DRIVERS

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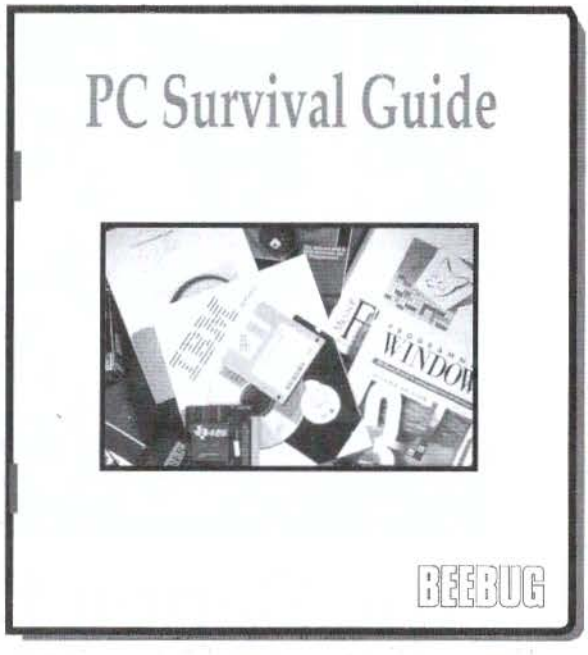

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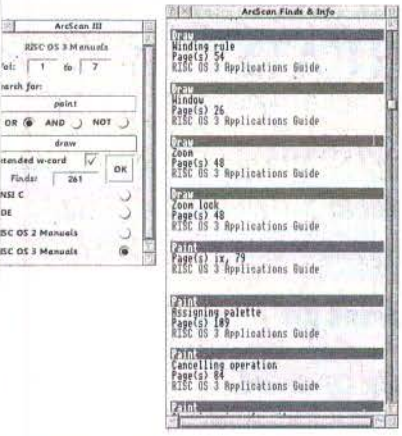

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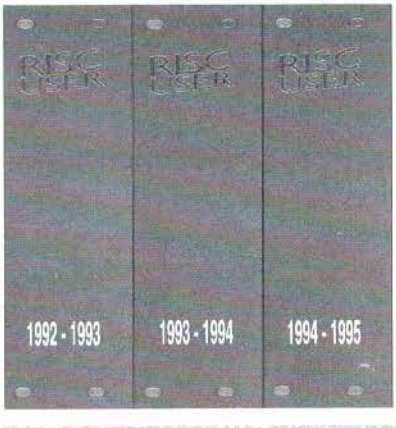

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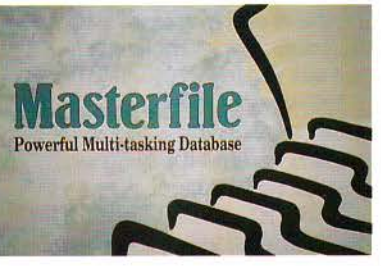

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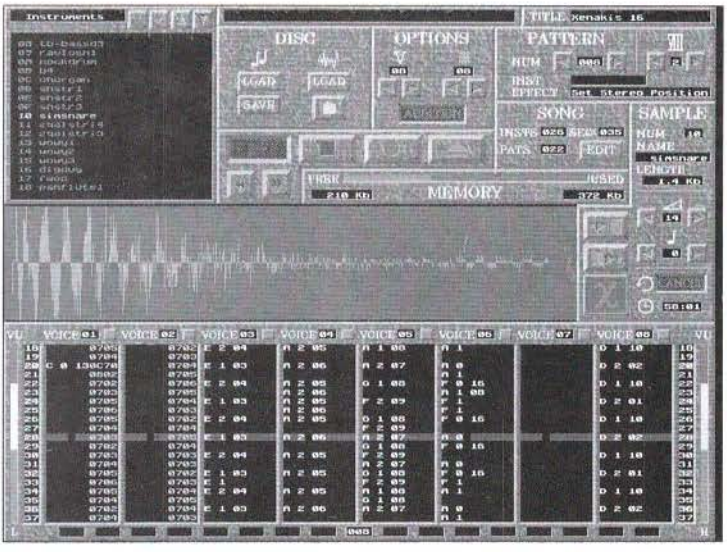
Xenakis 16

Iannis Xenakis is a modern composer who used mathematical and computer means to handle large numbers of musical events. Matt Browne examines his software namesake



Xenakis 16 in action

If you've ever used Digital Symphony, Desktop Tracker or a similar application before, you'll understand the concept behind Xenakis 16 immediately. It's another soundtracker music application for RISC OS. If you don't know about tracker music, it's worth explaining what it is before continuing.

Background

The idea behind soundtrackers, originally spawned from the Amiga platform, is one of simplicity. They offer people with little or no knowledge of music (and its potentially complicated notation) the opportunity to create high quality music by entering 'notes' as instructions, each of which can have a fancy audio effect associated with it. Each instruction is played using a sound sample (a digital snippet of sound); and thousands of samples are available from a variety of sources in the public domain, with sounds ranging from orchestral instruments to flushing toilets! Soundtrackers are fun to create, and easy for programmers to incorporate into demos and games.

Until now, all soundtracker applications available for RISC OS have used 8-bit samples, instead of the far superior, CD-quality, 16-bit variety that new Acorn hardware now supports. Xenakis 16 is different, however, as it can use 16-bit samples to produce music of exceptionally high quality. The main side-effect of using 16-bit samples is that they take up twice the amount of memory and disc space as their 8-bit cousins.

Requirements

Xenakis 16 comes on three discs and needs at least 4Mb of hard disc space free. It also needs a machine with RISC OS 3 and at least 2MB of memory to run effectively. If you want to use its 16-bit sound capabilities, you have to own a Risc PC with an Acorn-compliant audio card, like Acorn's own version or ESP's Minnie card. Most importantly, however, it requires a monitor of VGA quality (or better) to be used, and the computer it runs on has to be capable of displaying screen mode 31. This means that it's not feasible for use with Archimedes 300, 400 and A3000 series machines unless they have a suitable VIDC Enhancer. (If you don't have a VIDC Enhancer, they are available from Beebug for £29.95+VAT.) There shouldn't be any problems if you have a newer machine and a high-resolution monitor.

After a lengthy installation process onto hard disc, Xenakis is ready to roll. To prevent unauthorised copying, the authors have used a copy protection method that only allows the program to be run on one machine.

In use

Initially I was rather worried to discover that Xenakis doesn't run entirely from the desktop: for playing and editing tunes, you are whisked out of your cosy desktop to what initially seems to be a rather cramped screen. However, despite my desktop fanaticism, I have to admit that it is still very effective, surprisingly easy to use and well organised. Having said

that, though, I would still have preferred to use a nice desktop-compliant application; in fact, this is being dealt with by Dexedream at the moment.

To operate the program, you have to use a combination of the mouse to select operations and cursor keys to scroll around the pattern you are editing. There are keyboard shortcuts for most actions (like playing the song, editing a pattern, etc.) which can save a great deal of time in the long run. A useful 'audition' feature plays the notes you have recorded in each pattern as you move through it whilst editing, making finding that single dodgy note much easier.

While I was very pleased with the overall presentation of the main application screen, its way of accessing stored songs or samples is rather fiddly to use, where there is a system of having to click on arrow icons to scroll lists of files and directories. This is fine if you keep all your songs in one directory, but becomes distinctly irritating if they you want to store them in a series of categorised directories. Fortunately, therefore, you can load songs in the desktop by dragging them to Xenakis 16's icon on the icon bar. Even so, it's still tiring to have to constantly go in and out of the desktop whenever you want to load in a new song!

If you're proficient at using other tracker applications it'll initially come as a surprise to discover that, by default, songs are saved without their samples. Instead, all samples are organised separately in a database inside Xenakis, in the same way as the popular Coconizer public domain package works. The main advantage of this is the massive reduction of disc space taken up if you have a lot of songs, each sharing a number of samples. However, there is serious potential for confusion caused with this scheme, so if you want to distribute your creation to a number of people, you have to ensure that you distribute a version which does have the samples included (available as a separate option inside Xenakis).

A freeware tune player is included as part of the package, although it isn't particularly inspiring in the visual stimulation department. A rather good player module is also provided, with a comprehensive suite of SWIs so you can play your top tune as part of your own demo or game.

Sounds good

I was very impressed with Xenakis 16's manual. It introduces the program in a tutorial style and then describes it in greater depth, allowing it to be used for reference and also as a personal tutor. The only thing I missed was an index, as it's often rather difficult to find details about a particular function in the program.

If you're lucky enough to have the heavyweight hardware, you can use 16-bit samples (some of which are provided with Xenakis 16) to create tunes of absolutely astonishingly good quality. Unfortunately, the English language doesn't quite stretch to an accurate representation of sound quality; but it's like being in a dark room and someone switching the light on. It's a particularly varied and groovy light, too.

However, as they say, nothing's perfect; and Xenakis 16 doesn't quite escape this old adage. The desktop front-end is rather poor, with windows that take up far too much space and appear off the screen in 640x480 display modes (such as the old mode 27), rendering them unusable without first going into a larger mode. I was also very concerned about the way memory is allocated for tunes. Before loading Xenakis 16 you have to move the 'Next' bar in the Task Display to provide an adequate amount of memory for the tunes you want to load. If you decide that you haven't allocated enough memory, or need to free some for another purpose, you have to quit Xenakis 16 and reload it. Obviously, this is likely to be very confusing for novice users. The ability to change the amount of memory it uses from inside the application would have been infinitely preferable, or at least a dedicated Dynamic Area for use under Risc PCs.

The future looks particularly rosy for Xenakis 16. Dexedream have plans to release a future product called Xenakis Pro sometime in the future. Along with all Xenakis 16's features, it will include a complete desktop front-end, an extensive sample editing suite, 16 voices available at once, and an option to output to SCSI DAT devices for professional-quality sound mastering. If all these features come about, we will have something very impressive coming our way!

Conclusions

Despite a few minor niggles about Xenakis 16, I still have no hesitation in recommending it. It's versatile, well-designed and written, and allows anyone to create good music quickly, largely regardless of their musical abilities. It also comes with an excellent manual. Its full potential is unlocked with a 16-bit sound card and a Risc PC; they can be used together to make blindingly good tunes. For this purpose it is unique on the Acorn platform. Otherwise, it still holds its own against products like Digital Symphony, and is good value for money too. Great stuff, and I can't wait for Xenakis Pro.

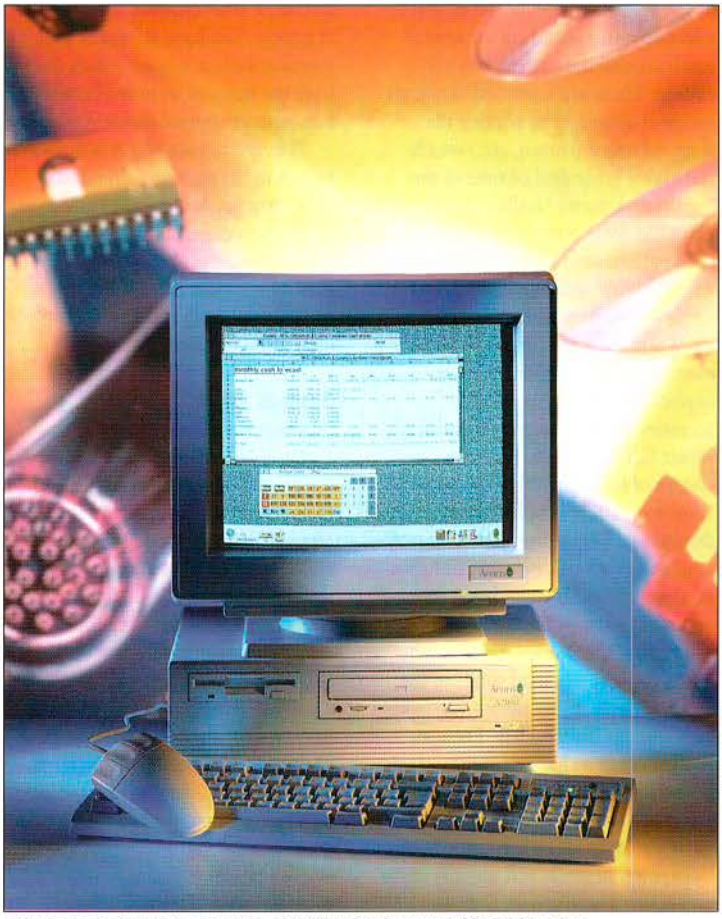
Xenakis 16

Supplier Dexedream Productions
12 Alne Terrace
York YO1 5AW
Tel. 01904 625212
E-mail: dexedream@digibank.demon.co.uk

Price £19.95 + £1.50 P&P (No VAT)

The A7000

Chris Drage examines Acorn's latest computer for the education market



Tailor made for schools: The A7000 with internal CD ROM drive.

The A5000 is dead; long live the A7000! Such news can be music to the ears of computer enthusiasts with a few pounds in their pockets. For hard-pressed schools, however, the underlying fear is that existing systems might be relegated to premature redundancy. Let's get one thing straight on that point: Acorn is one computer company whose backward-compatibility is second to none, which is more than can be said for some of the bigger players in the school computer stakes. With its recent reorganisation into three separate groups, Acorn has at last truly pinned its colours to the education market with the establishment of Acorn Education. As if to underpin and confirm this commitment, Acorn has introduced the A7000 model, tailor-made to suit the requirements of schools. The existing A3020 and A4000 systems are to be continued, as these are popular models which, with the recent price-drops, look more attractive than ever for the primary and special needs sectors. From experience, though, it is wise to order these machines with at least 4Mb of memory installed.

Making choices

I don't intend to go into depth about the technicalities of the new machine, but one or two points about the hardware provision will have a direct effect on your choice of model. For example, the A7000 does not have an auxiliary headphone/speaker socket at the rear, which means that if you want one to form the basis of a multimedia CD-ROM workstation in the library, for instance, you are left with the computer's own rather limited internal speaker. Similarly, if you want to gain access to the best PC CD-ROMs, there's no second processor socket in this machine for you to add the PC486 card. The message is clear: check your needs carefully before sizing up the model that will meet both present and future requirements. There is a lot which is good about the new machine, with the most obvious advantage being its size. The A7000's diminutive footprint fits a primary desktop with room to

spare for a mouse mat! It is sturdily built, and should survive the rigours of classroom use well. It has a new, faster processor (the ARM7500), offers much better sound performance, and an improved filecore permits access to hard drives larger than the previous limit of 512Mb. Similarly, there's enhanced video, memory and printer port performance.

Expansion is very limited, however: there is one bay which can take either a 32-bit expansion card or a 5.25in device such as an optional CD-ROM drive, but not both. In terms of memory, you can upgrade from the basic 2 or 4Mb RAM of the model you choose by adding a SIMM card to the one slot available, in the manner of the Risc PC. The maximum additional memory possible is 128Mb. The lack of VRAM, though, makes itself felt in the limited desktop modes available: 16 colours (1024 x 768), 256 colours (800 x 600) and 32 thousand colours (640 x 480). This should not prove a problem for schools, though, unless you are doing serious graphic work.

Similarly, the lack of expansion should not prove a limitation, as a CD-ROM or SCSI adapter can be plugged into the A7000's high-speed bi-directional printer port. A network socket removes the need to use the expansion slot for networking hardware: with suitable cabling, a network of A7000s is very straightforward to build. Those not using the socket for that purpose will find that it can be used instead to take a PC-style analogue joystick. The A7000 NET network (hard disc-less) model is also available, with a built-in Econet or Ethernet networking card. Never before has Acorn developed such a network-friendly machine. At the top of the range, the 4Mb RAM, 875Mb hard disc model offers a very attractive stand-alone solution, and is the one I would recommend for the majority of non-networked primary classrooms.

The economy model

The machines are equipped with RISC OS 3.6, which is designed to run only with the newer ARM 600, 700 and 7500 processors. The improvements help conserve precious memory and offer gains in speed. Firstly, there's the Acorn Access networking suite which is now built into the operating system and does not need to be loaded into RAM in order to run. Another, less obvious, saving could be achieved by the fact that you might get away with purchasing 2Mb computers as the memory overheads have been reduced. Realistically, though, anything less than 4Mb of memory will prove to be limiting. At last Printers is now in ROM, which results in a further saving of around 200K of memory, along with speedier loading on network stations. Naturally, printer driver definition files still need to be created and loaded into RAM when used. Paint and Draw, too, have improvements centred mainly around JPEG file handling. Paint can now convert JPEGs to sprites, whilst Draw can load and render JPEG files very quickly with efficient memory savings being made.

Clearly, the A7000 is a cut-down Risc PC without VRAM and with very little expansion potential. Despite this, it exceeds the A5000 it replaces in almost all respects, and represents an important statement of Acorn's attitude and commitment to education. It has been designed to withstand the rigours of classroom use, and is clearly placed between the A3020 and the Risc PC. A predictable machine the A7000 might be, yet it embodies common sense and offers schools more than enough computing power for the future. In my experience, I cannot see its facilities being exceeded, in terms of school use, for seven or eight years to come.

Which one would I buy? If I was setting up stand-alone machines in a primary school today I would equip each class with at least one A7000, 4Mb RAM, 425Mb hard disc computer with AKF60 (hi-res) monitors and one multimedia Risc PC equipped with headphones, speakers and a colour printer. Okay, I know, your school/PTA budget wouldn't be able to fund that lot! The one major advantage of going down the Acorn route in school IT is the fact that you can slot new machines into your existing hardware platform with the least disruption. Buying one as and when funds become available will not prove problematical, except perhaps when a teacher voices the protest: "Why has Mr Appleyard got the brand new machine and not my Year 5s?" Watch that one!

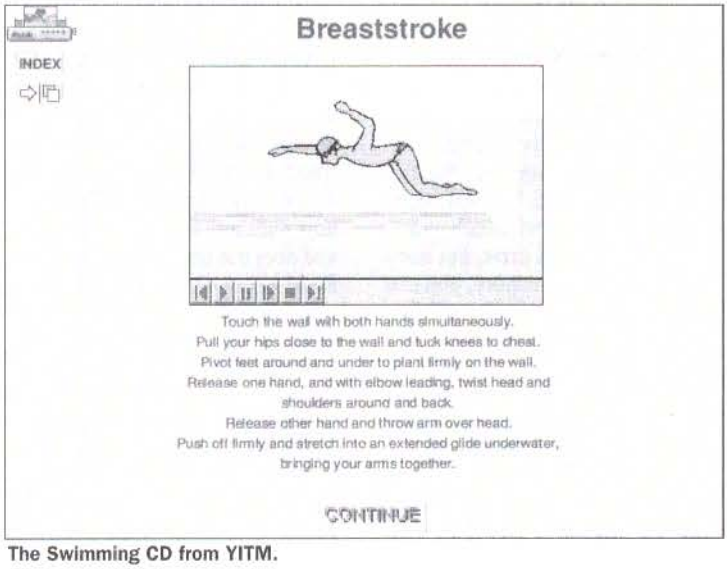
With Acorn's new strategy of selling to education directly, schools will find some quite generous reductions in prices. As far as the A7000 is concerned, it represents a huge improvement over the A4000, which was only marginally cheaper under the old price structure. You get more for your money all along the way with the A7000.

The A7000 computer comes in three configurations:

A7000 2Mb NET	£749 (REP)	£899 (RRP)
A7000 2Mb/425Mb H/D	£799 (REP)	£936 (RRP)
A7000 4Mb/875Mb H/D	£875 (REP)	£1021 (RRP)

Fun and Games

Mark Sealey looks at ways of teaching PE with Acorn software


Breaststroke
INDEX
Touch the wall with both hands simultaneously.
Pull your hips close to the wall and tuck knees to chest.
Pivot feet around and under to plant firmly on the wall.
Release one hand, and with elbow leading, twist head and shoulders around and back.
Release other hand and throw arm over head.
Push off firmly and stretch into an extended glide underwater, bringing your arms together.
CONTINUE

The Swimming CD from YITM.

Physical Education (PE) may not at first seem a likely area of the curriculum in which to use computers. In fact, there are many good and pupil-centred programs available which will make all the difference to your work with kids of all ages in the gym and on the fields... or in the pool.

Perhaps the best-known PE-specific title is the well-refined Swimming from CD Sports Ltd. Covering more than just the strokes, this interactive and highly visual suite (good use is made of animation) also examines water safety and associated issues.

Exercise

October Pen has two suites to help administer, teach and track the AAA Award Schemes that are being followed in many schools. It has long been known that where IT can make teachers' lives easier, it gets the sort of boost in use that (in certain environments) all the kids' clamouring and enthusiasm in the world cannot achieve. If yours is one of those schools, show AAA Five Star and Ten Step Awards to the person(s) responsible for PE and stand back.

There are times, usually at secondary level, when an understanding of the body will help with, say, the physiognomy of running, or will promote increased agility in floorwork. This is the time for TAG's Bodymapper, which allows kids to explore graphical representations of the human body from a variety of perspectives. It should be a good demonstration tool, too. Sherston's Bodywise could be used instead of, or as well as, this package.

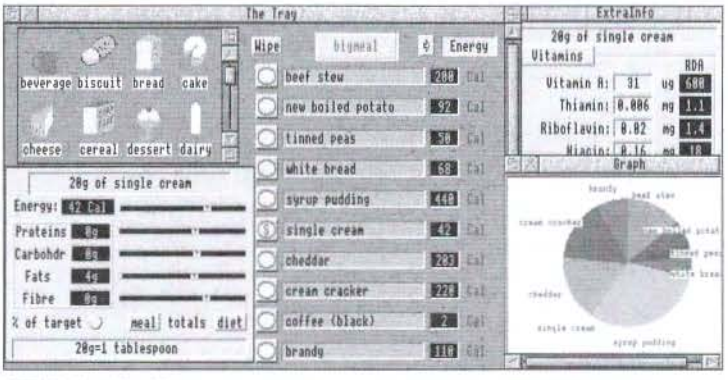
More ambitiously, there will be times (if your school can afford it) when you need to see and monitor real data, captured during exercise or demonstration. Here, the Chroma Genlock video cards (Computer Concepts) are what's needed. Pupils get much more from doing it themselves. Here is a chance for technology to meet with PE head on, so to speak.

Work with the Pocket Book could also rely on monitoring heart-rate and the like. Try the LogIT packs from Griffin and George. Of immense value (mainly) to kids working at key stages 2 to 4, the Palmtop Logging Software can actually be made to show such data logged in real time on a palmtop (the Acorn Pocket Book) as you work out.

Food!

Diet is an area that truly interests most children. MEWSoft publishes Diet Manager to look at the ways in which what you eat can be logged and its food value derived and understood. For slightly older children, Comcard also produce software for this field (Compute-a-Diet), as do both AVP and the British Nutrition Foundation.

In a related area, a small number of resources is beginning to appear that even look at leisure and shopping. Check out titles in the Software for Life series from Nordis. If you don't feel this is getting too far from the physical side of PE, then such firms as AVP (Freedom series) and Information Education Ltd are producing material for older kids to be used in tackling drug and alcohol abuse.



MEWSoft's Diet Manager

Generally

Children will need to record performance and the results of competitive events; clearly, simple spreadsheets come into their own here. Advantage, Eureka (Longman Logotron) and even PipeDream 4 (Colton) can be used to list competitors, teams, 'houses' or colours, and their events. Since each category of information can be used as a sort criterion, and the results of searches presented in a straightforward and tabulated format, they are ideal tools to use 'on the day', both for entering results as they come in and for displaying them as things progress. Selective Software's Sports Day is a dedicated suite to do a similar task.

In gymnastics, where sequences are being worked on and such areas as symmetry and shape are being explored, LOGO can be put to good use in order to plan, test and represent many movement-based activities, including dance. WINLogo (Longman Logotron) or ScreenTurtle (Topologika) would be best. Topologika's Navigator could even be used to plan and indicate routes in a variety of situations from outward bound-type adventures to group work, moving around obstacles and planning steeplechases, etc.

Pupils of all ages will also be able to make good use of open-ended suites like My World (SEMERC) to present their ideas for 'The Ideal Playground', 'Our New Gym' and 'The Early Olympics'.

And lastly, there is a host of clip-art which could be used to illustrate and support any presentation to parents/carers, school governors and other pupils of the type of sports work undertaken; this includes material from G.A. Herdman and the Micro Studio.

Now, would you still say that PE and the computer had little in common?

AVP
Tel. 01291 625439
Fax 01291 629671

British Nutrition Foundation
Tel. 0171 404 6504
Fax 0171 404 6747

CD Sports
Tel. 0151 691 0893

Colton
Tel. 01223 311881
Fax 01223 312010

Comcard
Tel/Fax 01905 778957

Computer Concepts
Tel. 01442 351000
Fax 01442 351010

G.A. Herdman
Tel. 01777 700918

Griffin and George
Tel. 01509 233344
Fax 01509 231893

Information Education Ltd
Tel, 01782 281643
Fax 01782 264200

Longman Logotron
Tel. 01223 425558
Fax 01223 425349

MEWSoft
Tel. 0171 267 2642
Fax 0171 482 6452

Micro Studio
Tel. 01353 720433
Fax 01353 624232

Nordis
Tel. 01604 754358
Fax 01604 758470

October PEN
Tel. 01705 592521
Fax 01705 594772

Selective Software
Tel/Fax 01458 223501

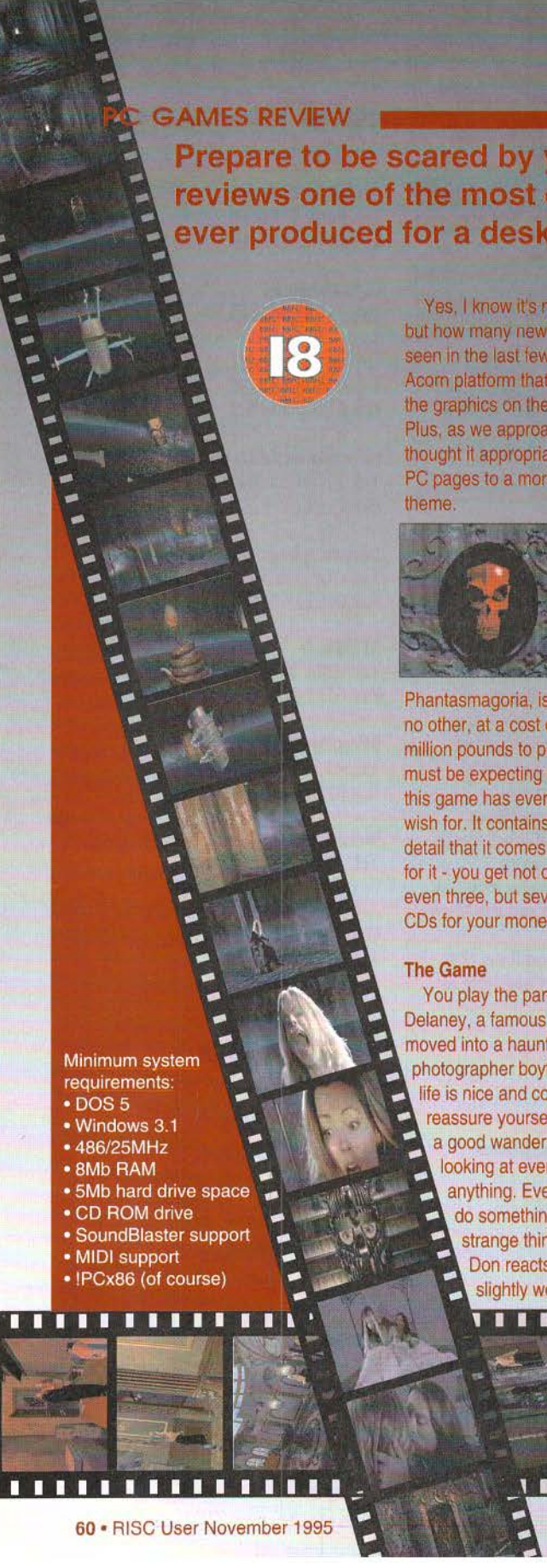
SEMERC
Tel. 0161 627 4469
Fax 0161 627 2381

Sherston
Tel. 01666 840433
Fax 01666 840048

TAG
Tel. 01474 357350
Fax 01474 537887

Topologika
Tel/Fax 01326 377771

Prepare to be scared by your PC card, as Paul Ashmore reviews one of the most expensive and graphical games ever produced for a desktop computer



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Yes, I know it's not an Acorn game, but how many new games have you seen in the last few months on the Acorn platform that can compete with the graphics on these two pages? Plus, as we approach Christmas we thought it appropriate to devote our PC pages to a more lighthearted theme.

The Hintmaster

Phantasmagoria, is an adventure like no other, at a cost of around £20 million pounds to produce, (they must be expecting to sell a few - Ed.) this game has everything you could wish for. It contains such incredible detail that it comes on CD, but wait for it - you get not one, not two, not even three, but seven fully packed CDs for your money.

The Game

You play the part of Adrienne Delaney, a famous writer, who has moved into a haunted house with her photographer boyfriend Don. At first, life is nice and cosy. You should reassure yourself of this by having a good wander around the house looking at everything and anything. Eventually, you will do something that makes strange things happen, and Don reacts by behaving in a slightly weird manner, Carno the magician can be blamed for this. Your mission is to get everything back to normal, and remove the devilish ghost that is devouring your loved one.

The game is divided into 7 chapters (could this be one chapter per CD?), with over 800 rooms to explore, and contains up to 25 characters you may actually never want to meet.

The special thing about Phantasmagoria is the way that real actors/actresses move around the screen on the graphical backdrops. All the cast scenes were done against blue backgrounds, and the graphics added later. Only then does it look like the cast are actually walking on the floor, or down the stairs.

The graphics are absolutely fabulous, and the sound is out of this

The Inspector's Eye

world. There is even a chant that you hear on occasions during the game when something spicy is about to happen. This Gregorian chant was performed by a 135-voice choir. There are sudden outbreaks of sound as well, like when a hand bursts out of nowhere (ooo-errrr it even made me jump a couple of times).

As the game requires a 256 colour

Minimum system requirements:
- DOS 5
- Windows 3.1
- 486/25MHz
- 8Mb RAM
- 5Mb hard drive space
- CD ROM drive
- SoundBlaster support
- MIDI support
- !PCx86 (of course)

PHANTASMAGORIA

THE CAST

Adrienne Delany

Don Gordon

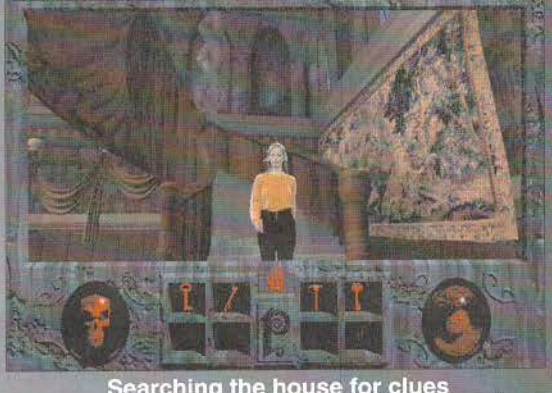
Carno

mode you will need Acorn's latest PCx86 software. It runs perfectly well on a PC600 with the standard PC486 card, however a faster processor (i.e. 486/DX2 and an ARM710) shows off the game to its absolute best.

Controls

Phantasmagoria is a mouse-driven game, allowing you to point to the direction in which you want Adrienne to walk. On your travels you will need to pick up many objects, but you can only hold eight at one time, so if you do put something down, for heaven's sake remember where you left it. Also you are advised to check in places you have visited before, as you never know what might have changed.

At the bottom of the screen you have two icons to help you in your quest to defeat the ghouls. First is the "Inspector's Eye", which allows you to look more closely at certain objects. Clicking on the left or right mouse button turns the object round. The second icon is the "Hintmaster", if you drag an object over him, he will tell you about it. He also gives you hints on how to complete the game (do not use him too much, or the game could be over quicker than you think)!


Searching the house for clues

Warning

This game is not for the faint-hearted, it has an eighteen certificate from the British Board of Film Certification, because of the violence and horror in some of the movies it shows. If you would like younger people to play, there is an option to downgrade the game to a censored version where none of the violence is shown (personally, I don't rate the violence as being too offensive).

Conclusion

Out you there and buy this one. It is a bit pricey, but as are a lot of PC games, and for 7 compact discs full it is actually good value. It seems that there will not be anything like this for another year, when the sequel called Phantasmagoria: A Puzzle of Flesh is due for release.

Next month I will have a round-up of the games launched at Acorn World '95, or just before. These will tantalise your taste buds, so go out and spend that money when you receive it for Christmas.

uR

Phantasmagoria	
Supplier	Sierra On-Line 4 Brewery Court Theale Reading Berkshire RG7 5AJ
Price	£49.99 plus VAT

Classifieds

Members may advertise their unwanted Acorn related hardware and software through the personal ads column free of charge. However, we are unable to guarantee in which issue your advertisement will appear. We also accept non-member's ads at the rate of 40p per word

Hearsay Comms package 2.19 complete with manual £20, Impression 2 with manual £20, Easyfont 3 boxed unused £5. Tel. Winchester 01962 862227.

Cannon IX 3010 A4 mono scanner plus Image Master and Twain £350, Cannon BJ200 printer and CC Turbo Driver for RISC OS 3 £200. Tel. Bucks 01494 762361.

Star SJ48 Bubblejet (equivalent to BJ10e) plus sheet feeder and 5 spare ink cartridges (worth about £80alone) all yours for just £150 plus £5 p&p if not collected ring John on Norfolk 01328 864177.

Arvis Videographics System - includes 16 bit framestore with real time video digitising, Genlock, chromakey facility, mixing and overlaying any combination of Archimedes graphics, framstore and live video, S-VHS and composite video input and output. Cost when new £1299 sell for £449 o.n.o. Tel. Swansea 01792 204519.

RISC PC600 9Mb/420Mb AKF60 monitor plus extra software etc. £1200. Tel. 01493 600966.

Minerva: Gammaplot (v2) £15, System Delta+ (V2) £25, Oak Solutions: Genesis (v2) £20, Educational: Investigating Local Industry £20, Sporting Triangles £5, The Art Machine 1&2 £20, Word Up Word Down £3, Books: MS DOS Quick reference £5, RISC OS 2 PRMs £35, all original software with documentation etc. Tel. Surrey 01737 832159 eves/w/ends.

WANTED: ROMs for BBC B, CC Spellmaster £15, Intersheet £10, Interchart £5. Tel. Camberley 01276 65512.

Laser Direct Hi res 4ppm 600dpi printer with CC card and Canon LBP4 printer. Printer has paper cassette and 1.5Mb RAM £300. Also, Epson LQ1060 wide carriage 24 pin colour printer, £100. Tel. Surrey 0181 642 3102.

A440/1, 4Mb RAM, 20Mb HD, RISC OS 3.1, ARM3, VIDC Enhancer good condition £430 o.n.o. Acorn Midi interface, EMR Studio 24+ (v2) £65, Printer port sound sampler and software £25 Tel. South Humberside 01724 841376 eves/w/ends.

ACB45 RISC PC 600, 8Mb + 2Mb VRam, 420Mb HD, internal dual speed Cumana 300i CD ROM, PC Emulator, DR DOS, 8 months old, VGC but no monitor £1350. Tel. W Sussex 01342 714905.

Complete starter system - A310 computer, twin floppy discs, mono monitor, Epson LQ850 24 pin printer, First Word Plus, Schema, Lemmings, Zarch, Golf £120 o.n.o. Excluding delivery. Tel. 01827 330118.

BEEBUG Disc Buffer for A400/1 series or A540, suitable for 3.5" or 5.25" external disc drives, complete with fitting instructions £20 o.n.o. Tel. Manchester 0161 724 4296.

Fireworkz Pro including all manuals, £95. Sim City 2000 (RISC PC) £14. Tel. Norfolk 01328 864177.

Canon and HP Turbodriver £25, WorraCAD £25, Irlam ProImage £25, Genesis Project £25, Pipedream 4 £20, Compression £15, Keystroke £10, Impressive £5, Bubblehelp £5, Printer crossover box £10, 2 slot backplane £10, MSDOS 6.2/Windows 3.11 £20, plus postage. Tel. 01827 330118 eves/w/ends.

Master 512, dual disc drive, 14" colour monitor, 30Mb HD, trackerball and more £245, Integrex Colourjet 132 printer £85, A310 PCB only, fully working £40, RISC OS 2 reference manuals £20. Tel. 01773 590832 eves.

Master 128 £90, quad cartridge for Master £6, 20Mb HD and ICS interface for A3000/A3010 £90. Tel. Blackpool 01253 767987 after 7pm.

WANTED: Genlock for A5000 & Clares Titler software. Tel. Blackpool 01253 767987 after 7pm.

Resultz, Easiwriter, Datapower, PC Emulator (DR DOS 6) £25 each, Pipedream 3, Euclid, Midnight Express, Pandoras Box, Lemmings & Oh No More Lemmings, Sim City, Haunted House £12 each, Superior Golf, Break 147/Pool £5 each. Tel. Herts 01462 682961 eves only.

Morley analogue/user port interface and teletext adaptor with multi-tasking software £100, suitable for A3000/A3010. Tel. Bury 0161 764 4362 after 6pm.

Lots of used Archimedes software needs a good home - some good bargains on offer. Phone quickly Herts 01707 324804.

CC Colour card gold complete with manuals, software and leads £80, PC card 486 with 4Mb RAM, co-processor, fast PALS, latest software and manuals £225. ICS Wizzo5 for A5000 £30, all include postage. Tel. 01992 462072.

Image Animator software in original case, immaculate £25, Watford twin 40/80T 5.25" double sided drive for BBC Micro £25. Tel. Wellingborough 01933 460166 after 2pm.

Acorn C/C++ package brand new, still in shrinkwrapped box only £150, also set of BEEBUG magazines, volumes 1to9 complete, offers please. Tel. Surrey 01342 844673.

Star 24pin dot matrix printer, boxed and in excellent condition £80 o.n.o. Complete collection of vols 1 to 5 of "BEEBUG" available to a good home. EMail dawsontp@cf.ac.uk. Tel. Cardiff 705304.

RISC PC600, 9Mb RAM, 210Mb HD, PC card, 14" monitor any reasonable offer considered. Tel. 01344 50446 after 6pm weekdays.

A420/1, 4Mb, 47Mb HD £290, A440 4Mb 47Mb HD £220, A440 4Mb 20Mb HD £210, all RISC OS 3.1 with U&A Guides, including p&p. Tel. 01223 293885.

Complete Z88 pack, computer 128k RAM pack, mains adaptor, Arc lead, print lead, carry case and manual, works well although battery link needs some attention £85.Z88 Computing by Ian Sinclair £3, Z88 Dabhand Guide £5. View - Dabhand Guide £4, BBC Master Reference Manuals (1&2) and Welcome Guide £14 the lot. Filestore (E01) and E60S (HD) for BBC Master with manuals £75. Longman S-Base personal edition, brand new, unregistered £40, Equasor original (not bundled) version £5, Schema speadsheet £15. Tel. Herts 01442 64003.

A540, 12Mb RAM, 120Mb SCSI HD, RISC OS 3.1, Acorn SCSI board, resident Irlam Moving IMage realtime video card, accepts VHS, SVHS, PAL or NTSC input, various software inc. PC Emulator - all manuals £1,100. Tel. Herts 01442 862708.

Intelligent Interfaces, IEEE488 for Archimedes, cost over £350, hardly used, also Viglen mouse, plus Tracer Ball, now have upgraded to PC so above can be had for around £25 cash the lot! Three new printer ribbons for Star LC10/LC100 for £2.50. Tel. Bucks 01494 452106 eves.

Aleph One PC Podule for Archimedes 486 CPU, 4Mb RAM. Tel. London 0171 388 0392 after 7pm.

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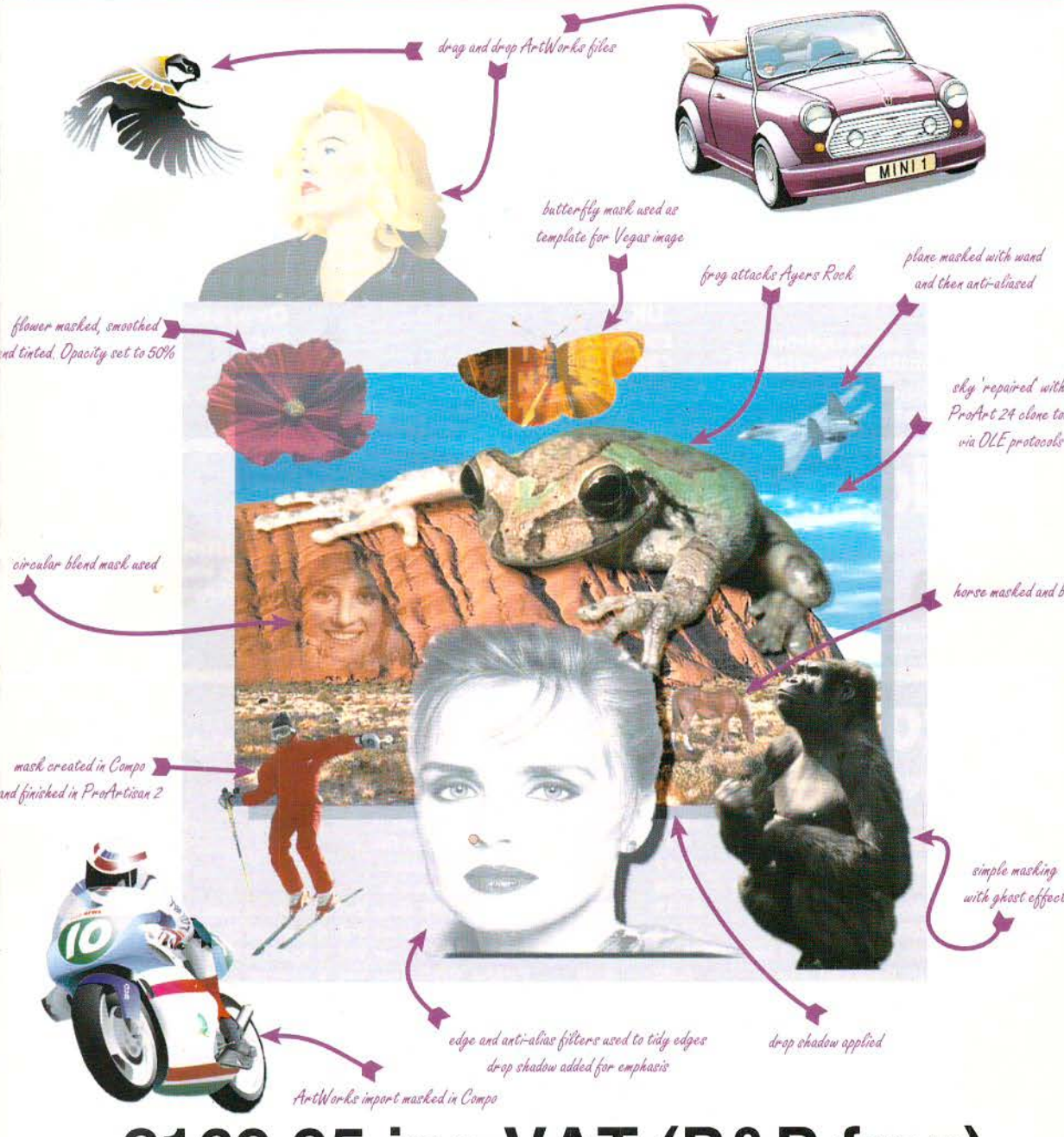
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